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Public Perceptions of the Midwest's Pavements - Iowa - Phase II (State Wide Survey Report)

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PUBLIC PERCEPTIONS OF

THE MIDWEST'S PAVEMENTS

Phase II Report, Statewide Surveys

IOWA

Submitted to the Iowa DOT

Prepared by the Marquette University Research Team

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INTRODUCTION AND OVERVIEW

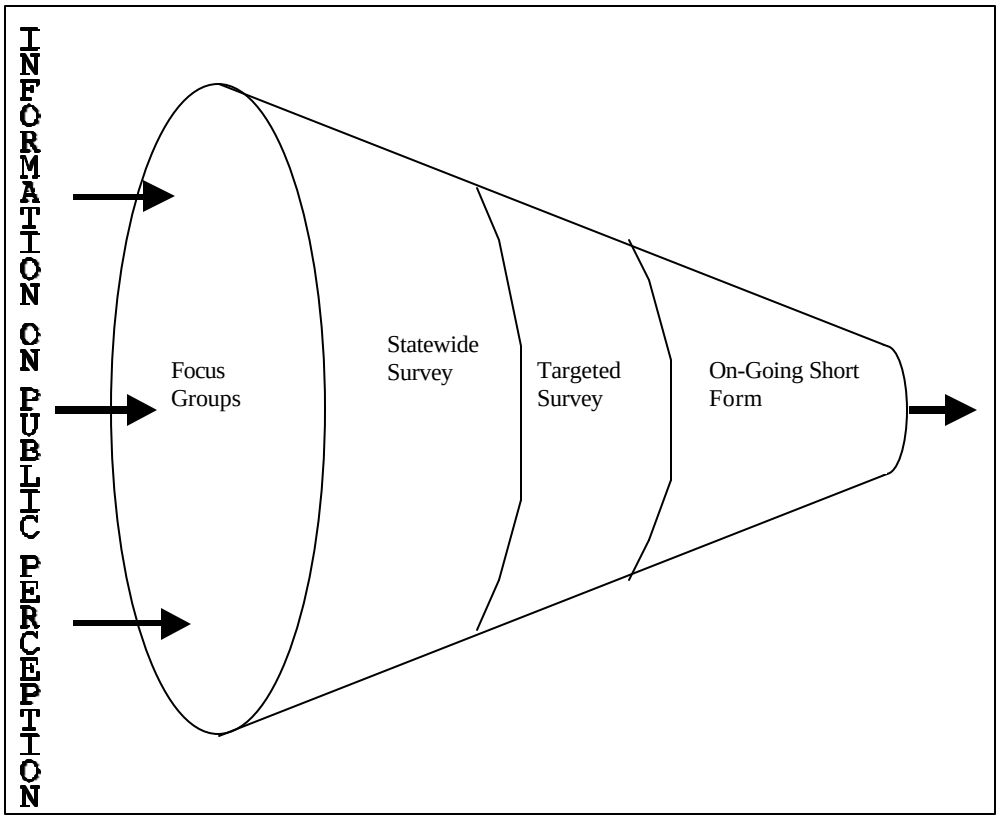
This report covers Phase II of a three-phase pooled-fund project in Wisconsin, Iowa and Minnesota, to determine the perception/satisfaction levels of the driving public and how they correlate with the states' physical data bases used to determine priorities for pavement improvements on rural, two-lane highways. In addition, policy issues of trust and improvement trade-offs are addressed.

In Phase I, six focus groups were conducted in each state to determine the beliefs and issues about pavements that could be used to draft statewide questionnaires. Focus groups were held during the last half of 1996 in all three states. From the focus groups a language used by the public to describe and differentiate ruts, grooves, tining and other pavement characteristics was developed so that the Phase II telephone surveys could help explain terms when needed.

Phase II began in late 1996, involving a lengthy process to arrive at a questionnaire that satisfied all three states. Phase II consisted of a statewide telephone survey of at least 400 randomly- selected drivers 18 years or older in each of the three states. Actual pretests of the statewide surveys occurred in early fall, 1997, with approximately 30 to 40 surveys in each state. The three statewide surveys were administered in Fall, 1997, and completed in mid December, 1997 in Wisconsin, and early January, 1998 in Iowa and Minnesota. Comprehensive analysis of the data has been underway since then.

The process used to gather information can be compared to a funnel. At the beginning, or wide end of the funnel, we only find out what people are thinking about, so we can draft a questionnaire. In Phase II, the questionnaire is still gathering broad information, and hopefully finds any regional or pavement type differences. But the sample size is too broad to draw detailed conclusions on thresholds of pavement indices that the states could rely upon in making major pavement improvements. In Phase III, surveys are targeted to know portions of highway where people can drive and report their perceptions on pavements with known conditions indices. Finally, a short form of the questionnaire will be tested, and this is the outlet of the funnel, where only those measures of satisfaction that most closely correlate with physical data bases are used as an ongoing tool by the DOTs to continuously monitor perceptions and expectations of the driving public.

The funnel is shown in the figure below.



This report is divided into two parts, and summaries and conclusions are provided with each part. In Part I, Trust and Trade-Off Analysis, those portions of the questionnaire dealing with policy issues such as trust in the DOT, improvement choices, perceptions on delay and construction preferences are analyzed. In Part II, The Relationship of Pavement Quality and Driver Satisfaction are reported, and the Expectancy Value theory applied and analyzed.

PHASE II REPORT
PUBLIC PERCEPTIONS OF THE MIDWEST'S PAVEMENTS
IOWA STATEWIDE SURVEY

SUMMARY

The telephone survey designed by the research team from Marquette University and conducted by Wisconsin Survey Research Laboratory (WSRL) yielded a final sample (after item- response missing data) of 384 respondents who had driven rural, two-lane state highways in Iowa. A brief review of key demographics and driving/vehicle characteristics will provide a perspective on these drivers. Respondent gender was split 55% males and 45% females. Age was divided into three categories: 1) 18-35 (30.8%), 2) 36-49 (35%), and 3) 50 and over (33.9%). Almost one-quarter (22.7%) had graduated from college. One-fourth (25.5%) had total household incomes less than $30,000, while 45.3% had incomes over $50,000.

In terms of the other characteristics, over half of the respondents drove cars (53.5%) with the next two largest segments being pickup trucks (26.6%) and minivans/vans (10.7%). Of the car drivers, 48.8% drove mid-size cars, 32.2% full-size and 19% compacts. Quality of ride was rated predominately "good or very good" (73%), with only 3.9% "poor or very poor." Of the 384 drivers, 19% held commercial driver licenses and 16.9% had motorcycle licenses. Over half of the respondents (51.5%) drove four or more days per week. One half (52.1%) drove less than 15,000 miles per year, while 20.1% drove over 25,000 miles annually.

Relationships among the variables were derived from cross tabulations, which essentially are matrices resulting from cross-tabulating the response frequencies of one survey question against those of another. The chi-square test of significance with a 95% confidence level was employed. To measure the strength of relationships, the Spearman Correlation Coefficient (SCC) was calculated. This process yielded statistically-significant relationships between trust questions 51-53a and trade-off questions 69-81, on the one hand, and associated survey variables, e.g., alternate route, on the other. Medium-level relationships (SCCs above .25) were found primarily for general driving-experience, pavement-belief, and satisfaction questions. For ease of reading, all statistically-significant relationships are summarized in Table 1, which follows the narrative text. The cross tabulations revealed a number of significant relationships which help explain Iowa drivers' responses to the trust and trade-off questions. Findings were well within overall expectations for consistency. Importantly, a clear majority (64 to 77%, depending on the particular trust question) of the 384 respondents exhibited trust in the Iowa DOT. Iowa drivers, moreover, were fairly understanding and tolerant of changes associated with pavement improvements.

As to the trade-off questions, 312 of the 384 respondents (81.3%) believed pavements can be built to last longer, and 97.4 percent of the 312 believed they should be built to last longer, even if the costs of building longer-lasting highways should be paid for by raising more funds.

Construction delays influenced choices on improvement trade-offs. When given the option of repairing 30 miles of highway either all at once, or in 10 mile segments over a three-year period, 60.4 percent chose 30 miles in one year. When asked about repair delays on a 10 mile stretch of highway, drivers opted for a shorter delay over a longer period of time, rather than a longer delay for a shorter period. The most frequently mentioned delay was about 10 to 20 minutes. As to speed limits for a 10 mile pavement repair section, the majority of respondents fell in the 30 to 40 mph range; most regarded speed limits under 30 mph as unacceptable.

When selecting from among five options for improvement priorities (fix bumpy highways, correct noisy pavements, resurface patched pavements, build longer lasting pavements, or reduce construction delay), over half (54%) chose “build longer lasting pavements,” with “fix bumpy pavements” second at only 17.7 percent.

A majority (75%) of Iowa drivers were satisfied with the two-lane rural highways they identified. However, the IRI, PCI and PATCH values which satisfied the majority of the sample were relatively low (in the “good” to “very good” range for IRI and "good" to "excellent" range for PCI). An important question is whether this finding is because drivers have high expectations and are satisfied with only the smoothest, distress free pavements or whether this finding is an anomaly of the data set. That is, if a disproportionate number of smooth and distress-free roads were sampled, this would artificially inflate the cutoffs at which a majority of respondents were satisfied with the pavement. In Phase III, the number of highways in each interpretive category will be controlled. It is also noteworthy that motorists seem willing to tolerate some dissatisfaction with pavement quality rather than have to deal with the inconvenience generated by highway repair.

The model performed well and as predicted, especially when it came to the relationship between cognitive structure (pavement beliefs) and satisfaction. In particular, the satisfaction index and its three component measures are extremely useful as diagnostic tools. The size of the coefficients testing the model are generally respectable for the social sciences, especially given the nature of the task — trying to predict something as complex as a person’s satisfaction.

The relationships between pavement characteristics and pavement beliefs are, however, relatively weak. It should be noted that these relationships might be stronger if it were not for a methodological limitation. Pavement indices are taken from a very specific section of every mile of the highway. Respondents’ perceptions are likely to have been a psychological averaging of pavement conditions over a much greater stretch of highway. With respect to

Phase III, the relationships in the entire model should become stronger **(1)** to the extent to which researchers can get respondents to be precise about the stretch of pavement to which they are referring, preferably by arranging for them to drive select stretches of highway in advance of answering questions about it, and **(2)** to the extent to which there are corresponding physical data for that section of highway. Also, the strength of the relationships in the model could have been improved if there had been a direct correspondence between pavement beliefs and pavement distress indices. In Phase III, physical pavement indices should correspond directly with the beliefs to be evaluated, for example, respondents could also be asked whether they believe a given stretch of highway is rough (IRI) and cracked or patched. This will greatly facilitate the investigation of the explanatory power of the notion that a person's beliefs about the pavement are what lead to reported satisfaction.

Recommendations for Phase III questions are also included based on correlations from the model applications.

Analysis of the Iowa data indicate the robustness of the model — especially the core relationships among physical data, cognitive structure, and satisfaction. These findings also replicate the analyses of the Wisconsin data. The model works well not only as an explainer of satisfaction with pavements but also as a diagnostic tool. The relationships between physical data and cognitive structure are very promising and consistent with expectations. In particular, targeted surveys should amplify the correlations between physical data and pavement beliefs and will lead the way to development of the "short form" survey instrument to be used periodically in the field.

PART I: TRUST AND TRADE-OFF ANALYSIS

INTRODUCTION

The purpose of this section of the Phase II Report on the Iowa State Survey is to present findings on the trust and trade-off questions, which were a key element of the questionnaire administered to Iowa motorists by Wisconsin Survey Research Laboratory (WSRL). In the preliminary analysis submitted by the Marquette University research team in March 1998, it was emphasized that the results were suggestive only of relationships among the survey data and would be confirmed or modified when the complete sample of respondents was processed. In that vein, final processing of the sample of Iowa drivers, accounting for item response missing data, yielded 384 usable respondents. It should be underscored that the findings reported here are the culmination of statistical analysis on the final set of 384 Iowa drivers. A full copy of the survey questions and responses is included as an appendix.

This report is based upon an examination of a series of cross tabulations between the trust and trade-off questions and the other survey variables to determine significant relationships. Statistical significance employed the well-accepted standard of a 95 percent confidence level. Further analysis of statistical relationships between pavement physical characteristics and measures of public satisfaction follow in Part 2.

Finally, it should be emphasized that the Iowa respondents were focused on two-lane, rural highways with speed limits of 55 miles per hour or greater. Also, drivers with a Commercial Driver License (CDL) or a motorcycle license were included in the survey.

TRUST QUESTION RESPONSES

Before considering specific relationship patterns, a perspective is needed on the four questions which comprise the trust section of the survey. Questions 51-53a were intended to reveal key aspects of the trust Iowa drivers have in the Iowa DOT. Question (Q) 51 addressed the Iowa DOT's capability while Q52 assessed the Iowa DOT's judgement. In Q53 and Q53a, respondents evaluated the Iowa DOT's care about drivers' safety and convenience and its consideration of drivers' input when making decisions about highway improvements. Responses of the 384 Iowa drivers are considered below.

Q51

The state DOT is CAPABLE of doing a good job of fixing and replacing pavements on rural highways in Iowa. (Would you strongly agree, somewhat agree, feel neutral, somewhat disagree, or strongly disagree?)

Over three-fourths (77.6%) of the 384 respondents agreed that the Iowa DOT is capable of doing a good job. Less than 10 percent (9.1%) disagreed. This is a relatively encouraging finding for the initial trust item in the questionnaire.

Q52

I trust the JUDGEMENT of the state DOT when it comes to scheduling pavement improvements.

Response to this question was less positive. Even though 64.1% agreed, over one-fifth

(20.8%) disagreed with this statement. Crosstab analysis will provide insights into this response outcome.

Q53

State DOT officials care about the safety and convenience of drivers on this stretch of road.

The Iowa DOT was predominately viewed as caring, with 77.6% of the motorists on the agree side. With less than 10 percent (8.1%) disagreeing, this represents another positive result of the survey.

Q53a

The DOT considers input from people like me when making decisions about repairs or improvements to this stretch of highway (Q20).

Although over one-third (37.5%) agreed with this statement, it may well be that this result reflects the prevailing perception of a growing distance between governmental agencies and the general public. It is important to recognize that 30.7% of the respondents were neutral on this item. Crosstab analysis should yield more perspective on the drivers' perceptions.

PAVEMENT EVALUATION RESPONSES

Also needed for a full perspective is a brief view of pavement evaluations. In questions 57-59 respondents were given an opportunity to evaluate the pavement on the highway section they normally drive (reported in Q20). Evaluation encompassed overall satisfaction, perceived need for improvement and comparison of their section with other sections of state highway they had driven recently in Iowa.

Q57

I am satisfied with the pavement on this section of highway (Q20). (Would you strongly agree, somewhat agree, feel neutral, somewhat disagree, or strongly disagree?)

Almost three-fourths of the 384 drivers (74 %) reported satisfaction with the pavement on the highway section in Iowa that they normally drive. This encouraging level of satisfaction should be viewed as a key feedback measure and as a frame of reference for the interpretation of other survey responses.

Q58

The pavement on this stretch of highway (Q20) should be improved.

Two-fifths (40.6%) of the motorists surveyed believed that the pavement on their designated highway section should be improved. Although this may seem inconsistent with the satisfaction level reported for the preceding item, this result should be viewed in the normative context of improvements which would be desired if funds potentially were available.

Q59

The pavement on this stretch of highway (Q20) is better than most of the stretches of state highways I've driven recently in Iowa.

This item on pavement comparison produced mixed responses. While 22.1% did not perceive the pavement on their highway section as better than most others, over half (53.9%) did see it as better. Interestingly, almost one-fourth (22.9%) were neutral. Overall, the pavement evaluations of the sample were within reasonable boundaries.

SAMPLE DESCRIPTION:
DEMOGRAPHICS AND DRIVING/VEHICLE CHARACTERISTICS

To complete the overview of the 384 Iowa respondents, the final sample can be described in terms of demographics and driving/vehicle characteristics. Responses to the demographic questions, i.e., age, education, income and gender, are included in Appendix 2. Also included are answers for driving parameters, vehicle type, size of car and quality of ride for the vehicle.

In terms of gender, the final sample was split between 56.8% males and 43.2% females. Age was divided into three groups: 1) 18-35 (30.8%), 2) 36-49 (35 %) and 3) 50 and over (33.9%). Almost one-fourth (22.7%) were college graduates. One fourth (25.5%) had total household incomes of less than $30,000, 29.2% reported incomes from $30,000 to $49,999 and 45.3% had incomes of $50,000 or more.

As to driving frequency, over half of the respondents (51.5%) drove four or more days per week (with 27.3% driving 6-7 days/week). Annual mileage was split between 52.1% driving less than 15,000 miles per year and 44.8% driving 15,000 or more miles annually. With regard to vehicle type, over half (53.6%) drove cars, with the next two largest segments being pickup trucks (26.6%) and minivans/vans (10.7%). Of the 206 car drivers, 48.8% drove mid-size cars, 32.2% full-size and 19% compact. Quality of ride ratings revealed 72.9% "good or very good," with only 3.9% "poor or very poor." Finally, as to other licenses, 19% of the sample held commercial driver licenses while 16.9% had motorcycle licenses.

Several data-analysis qualifiers are in order. Questions 100 (age), 104 (annual mileage), and 109 (income) were open-end. For the crosstab analysis, the open-end responses to these three questions needed to be consolidated into groups. The resulting groups reflected a reasonable division of the response data. At the same time, the categories for Q108 on education were condensed to three for effective analysis. Such data consolidation yielded more readily-interpretable crosstab results.

TRUST QUESTION CROSSTAB ANALYSIS

The trust section of the statewide survey highlighted above comprised questions 51 through 53a. The analysis entailed cross-tabulating these questions against the following groups of other survey questions: **1)** general driving experience questions 3-5a; **2)** pavement belief questions 32-40; **3)** non-pavement questions 42-48; **4)** alternate route Q55; **5)** satisfaction questions 57-59; **6)** vehicle type questions 101-103; **7)** annual mileage Q104; **8)** demographic questions: age Q100, education Q108, income Q109, gender Q998b; and **9)** licenses, Q105 and

105a.

It is important at this point to identify the specific nature of the statistical analysis conducted on the survey data. The chi-square test of independence was employed to determine whether relationships between cross tabulated variables were significant at the 95 percent confidence level. With regard to expected frequencies in cells, less stringent conditions, which have been recently recognized in the literature, were accepted. Since the survey data are predominately ordinal in nature, the appropriate test is the Spearman Correlation Coefficient, which has been applied throughout the crosstab analysis. Unlike some correlations, the Spearman correlation between one set of variables can be compared to the Spearman correlation of any other set. The coefficient usually ranges from -1 to +1. A coefficient greater than 0 indicates *concordance.* A coefficient less than 0 indicates *discordance.* A coefficient of 0 indicates no correlation. Spearman's correlation is appropriate for two sets of non-continuous ordinal data. Spearman's correlation is especially appropriate for the 5-point Likert scale (which is non-continuous, ordinal) that is used for most of the state-wide survey. However, since questions on policy trade-offs are discrete, non-ordinal random variables, the policy trade-off questions are not expected to produce powerful correlations. Any correlation that *may* exist simply reveals the nature of polarization between the two variables. In that the term "crosstab" will be used repeatedly in subsequent report sections, it has been abbreviated to "Xtab."

Q51

The state DOT is CAPABLE of doing a good job of fixing and replacing pavements on rural highways in Iowa. (Would you strongly agree, somewhat agree, feel neutral, somewhat disagree, or strongly disagree?)

To avoid repetition, all four trust questions had similar agree-disagree responses. Review of the Xtabs, i.e., Q51 vs. the aforementioned groups of variables, yielded a number of statistically-significant relationships. Response to Q51, to reiterate, was predominately in the affirmative. All four general driving-experience questions were significantly related to this trust question, with accompanying statistically-significant Spearman Correlation Coefficients (SCC). Selection of "strongly agree" that the Iowa DOT is capable of doing a good job was more frequent for drivers who strongly agreed that Iowa rural, two-lane highways (IRTH) have smooth riding surfaces (Q3) than for those who strongly disagreed. At the same time, choice of "strongly agree" was much more frequent for respondents who strongly agreed that IRTH are in good condition (Q4) vs. for those who strongly disagreed [Strongly Agree (SA) 48.1% vs. Strongly Disagree (SD) 33.3%]. For Q5, motorists who strongly agreed that IRTH have pavements safe to drive were twice as likely to strongly agree that the Iowa DOT is capable as were those who strongly disagreed [SA 53.7% vs. SD 23.5%]. Finally, respondents who strongly agreed that IRTH pavements are very satisfactory (Q5a) were three times as likely to somewhat agree that the Iowa DOT is capable vs. those who strongly disagreed [SA 45.6% vs. SD 15.4%].

With reference to pavement beliefs, three of the five variables were significantly related to Q51. Selection of "somewhat agree" as to the Iowa DOT's capability was almost twice as frequent for respondents who somewhat disagreed that their vehicle had extra wear from driving on their highway section's pavement (Q32) as for those who strongly agreed [Somewhat

Disagree (SWD) 59.5% vs. Somewhat Agree (SWA) 33.3%]. Likewise, drivers who strongly disagreed that their pavement section produced a bumpy ride (Q34) were more than twice as likely to somewhat agree on the Iowa DOT's capability [SD 49.7% vs. SA 18.2%]. Motorists who strongly disagreed that their section's pavement was noisy (Q38) tended more to strongly agree that the Iowa DOT is capable vs. those who strongly agreed.

The satisfaction items clearly outperformed the demographic/vehicle items in terms of statistically-significant relationships. For the satisfaction items, all three (Q57-59) were significantly associated with this trust item. In contrast, only one vehicle-characteristic item, Q103, bore a relationship. Drivers who were very satisfied with their highway section's pavement (Q57) were almost twice as likely to somewhat agree on the Iowa DOT's capability than were those who were very dissatisfied [Very Satisfied (VS) 46.3% vs. Very Dissatisfied (VD) 25%]. Motorists who strongly disagreed that their section's pavement should be improved (Q58) were much more likely to somewhat agree that the Iowa DOT is capable vs. those who strongly agreed. Similarly, choice of "somewhat agree" on the Iowa DOT's capability was much more frequent for respondents who strongly agreed that their section's pavement was better than most others (Q59) than for those who strongly disagreed [SA 39.1% vs. SD 25%]. As to vehicle characteristics, drivers who rated their vehicle's ride quality as "very good" (Q103) were much more likely to strongly agree that the Iowa DOT is capable than were those chose other ratings ["very good" 47.7% vs. 23.5% or less for other rating categories].

Q52

I trust the JUDGEMENT of the state DOT when it comes to scheduling pavement improvements.

This question directly addressed the "trust" dimension, and accordingly, was influenced by a number of other variables. For driving-experience items, all four were significantly related to Q52. Choice of "strongly agree" on trusting the Iowa DOT's judgment was four times as frequent for motorists who strongly agreed that IRTH have smooth riding surfaces (Q3) as for those who strongly disagreed [SA 40.7% vs. SD 10.1%]. Likewise, selection of "strongly agree" on this trust item was almost three times as frequent for respondents who strongly agreed that IRTH are in good condition (Q4) vs. those who strongly disagreed [SA 43.6% vs. SD 15.4%]. At the same time, "somewhat agree" on trust in the Iowa DOT's judgment was chosen twice as frequently by motorists who somewhat agreed that IRTH have pavements safe to drive (Q5) as by those who somewhat disagreed [SWA 46.5% vs. SWD 23.3%]. Finally, drivers who strongly agreed that IRTH pavements are very satisfactory (Q5a) were almost three times as likely to strongly agree on trust as were those who strongly disagreed [SA 37.6% vs. SD 13.3%].

With regard to pavement beliefs, four of the five items were significantly associated with Q52. Respondents who strongly disagreed that their vehicle had extra wear from driving on their section's pavement (Q32) were more likely to strongly agree on trust than those who strongly agreed. Selection of "somewhat agree" on trust was more than twice as frequent for drivers who strongly disagreed that their pavement section produced a bumpy ride (Q34) than for those who strongly agreed [SD 46.3% vs. SA 17.8%]. Likewise, motorists who strongly disagreed that their section's pavement was noisy (Q38) were more than twice as likely to strongly agree with this trust item than were those who strongly agreed [SD 31% vs. SA 12.5%].

Lastly, drivers who strongly disagreed that their section's pavement looked patchy (Q40) were much more likely to somewhat agree with this trust question vs. those who strongly agreed [SD 44.3% vs. SA 25.4%].

While significant relationships for Q51 jumped to the satisfaction items, there were two variables that entered in ahead of these for Q52—one non-pavement and the alternate route question. Respondents who strongly agreed that the scenery on their highway section was attractive (Q46) were nearly twice as likely to strongly agree on trust as were those who strongly disagreed [SA 31.5% vs. SD 16.7%]. Choice of "strongly agree" on trust was twice as frequent for motorists who strongly agreed that they could find an alternate route (Q55) as for those who strongly disagreed [SA 35.2% vs. SD 16.8%].

As was true for Q51, all three satisfaction measures (Q57-59) and Q103 were significantly related to Q52. Drivers who were very satisfied with their section's pavement (Q57) were more than three times as likely to strongly agree with this trust item as were those who were very dissatisfied [VS 37.9% vs. VD 10.8%]. The Spearman Correlation Coefficient of .37 for this relationship was one of the strongest encountered. For Q58, choice of "strongly agree" on trust was twice as frequent for respondents who strongly disagreed that their section's pavement should be improved as for those who strongly agreed [SD 34.2% vs. SA 16.5%]. Finally, motorists who strongly agreed that their section's pavement was better than most others (Q59) were twice as likely to strongly agree on trust as were those who strongly disagreed [SA 38% vs. SD 18.9%]. Ride quality (Q103) came into play with drivers rating their vehicle's ride quality as "poor" much more likely to somewhat disagree with this trust item than those who selected other ratings ["poor" 25% vs. 15% or less for other rating categories].

Q53

State DOT officials care about the safety and convenience of drivers on this stretch of road.

Consistent with the previous two trust items, all four driving-experience items were significantly associated with Q53. Selection of "strongly agree" that the Iowa DOT cares about drivers' needs was twice as frequent for motorists who strongly agreed that IRTH have smooth riding surfaces (Q3) as for those who strongly disagreed [SA 55.6% vs. SD 26.9%]. Likewise, respondents who strongly agreed that IRTH are in good condition (Q4) were more than twice as likely to strongly agree that the Iowa DOT cares than were those who strongly disagreed [SA 64.6% vs. SD 25%]. Choice of "strongly agree" that the Iowa DOT cares was much more frequent for drivers who somewhat agreed that IRTH have pavements safe to drive (Q5) as for those who strongly disagreed [SWA 32.2% vs. SWD 18.8%]. Similarly, motorists who strongly agreed that IRTH pavements are very satisfactory (Q5a) were more than twice as likely to strongly agree that the Iowa DOT cares vs. those who strongly disagreed [SA 57.3% vs. SD 23.1%].

This was the only trust item for which all five pavement belief items (Q32-40) exhibited statistically-significant relationships. Drivers who strongly disagreed that their vehicle had extra wear from driving on their section's pavement (Q32) tended more to strongly agree that the Iowa DOT cares than those who strongly agreed [SD 46.5% vs. SA 32.4%]. At the same

time, respondents who strongly disagreed that their section's pavement yielded a bumpy ride (Q34) were somewhat more likely to strongly agree that the Iowa DOT cares than were those who strongly agreed [SD 46.3% vs. SA 37.2%]. Selection of "somewhat agree" that the Iowa DOT cares was more frequent for drivers who strongly disagreed that their section's pavement caused them to focus their attention on the pavement surface (Q36) than for those who strongly agreed [SD 39.5% vs. SA 26.4%]. Motorists who strongly disagreed that their section's pavement was noisy (Q38) were more than twice as likely to strongly agree that the Iowa DOT cares as were those who strongly agreed [SD 48.6% vs. SA 21.1%]. Lastly, selection of "strongly disagree" that the Iowa DOT cares was twice as frequent for respondents who strongly agreed that their highway section's pavement looked patchy (Q40) as for those who strongly disagreed [SA 46.2% vs. SD 23.1%].

Three non-pavement questions entered in with significant association. Choice of "strongly agree" that the Iowa DOT cares was twice as frequent for drivers who strongly agreed that they were comfortable pulling onto the shoulder on their highway section (Q43) as for those who strongly disagreed [SA 57.3% vs. SD 27.7%]. Likewise, motorists who strongly agreed that the lines on their highway section were clear and easy to see (Q45) tended more to strongly agree that the Iowa DOT cares than those who strongly disagreed. "Strongly agree" that the Iowa DOT cares was also chosen more often by respondents who strongly agreed that the scenery on their section was attractive (Q46) than by those who strongly disagreed [SA 57% vs. SD 41.4%].

Once again, all three satisfaction items were significantly related to this trust item. Drivers who were very satisfied with their section's pavement (Q57) were more than twice as likely to strongly agree that the Iowa DOT cares as were those who were very dissatisfied [VS 56.5% vs. VD 22.2%]. This relationship had one of the higher SCCs at .33. "Strongly agree" that the Iowa DOT cares was selected more often by respondents who strongly disagreed that their section's pavement should be improved (Q58) than by those who strongly agreed [SD 55.1% vs. SA 38.2%]. At the same time, motorists who strongly agreed that their section's pavement was better than most others (Q59) were more than twice as likely to strongly agree that the Iowa DOT cares as were those who strongly disagreed [SA 57.6% vs. SD 25%].

Q53a

The DOT considers input from people like me when making decisions about repairs or improvements to this stretch of highway (Q20).

All four driving-experience items were significantly related to Q53a. Selection of "strongly agree" that the Iowa DOT considers input was more than three times as frequent for drivers who strongly agreed that IRTH have smooth riding surfaces (Q3) as for those who strongly disagreed [SA 26.4% vs. SD 7.4%]. "Strongly agree" that the Iowa DOT notes input was chosen more often by respondents who strongly agreed that IRTH are in good condition (Q4) than by those who strongly disagreed. The same was true for those who strongly agreed that IRTH pavements are safe to drive (Q5). In contrast, motorists who strongly disagreed that IRTH pavements are very satisfactory (Q5a) were more than five times as likely to strongly disagree that the Iowa DOT heeds input than were those who strongly agreed [SD 42.9% vs. SA

7.3%].

While only one pavement belief question (Q34) came into play, three non-pavement items, as well as Q55, had significant influence on Q53a. Selection of "strongly disagree" that the Iowa DOT considers input was more than three times as frequent for drivers who strongly agreed that their section produced a bumpy ride (Q34) as for those who strongly disagreed [SA 27.9% vs. SD 6.6%]. For the first of the three non-pavement items, respondents who strongly agreed that they were comfortable pulling onto their section's shoulder (Q43) were more than three times as likely to somewhat agree that the Iowa DOT heeds input vs. those who somewhat disagreed [SWA 30.5% vs. SWD 7.7%]. Choice of "strongly agree" that the Iowa DOT notes input was twice as frequent for motorists who strongly agreed that the lines on their section were easy to see (Q45) as for those who strongly disagreed [SA 22.1% vs. SD 11%]. On the other hand, "strongly disagree" was selected more than twice as often by drivers who strongly disagreed that their section's scenery was attractive (Q46) as by those who strongly agreed [SD 29.6% vs. SA 11.5%]. Finally, "strongly agree" that the Iowa DOT considers input was chosen more than twice as often by respondents who strongly agreed that they could easily find an alternate route (Q55) as by those who strongly disagreed [SA 23.8% vs. SD 11.1%].

For this final trust item, all three satisfaction items again had a significant influence along with one demographic question. Motorists who were very dissatisfied with their section's pavement (Q57) were more than four times as likely to strongly disagree that the Iowa DOT notes input as were those who were very satisfied [VD 31.4% vs. VS 6.7%]. "Strongly agree" that the Iowa DOT heeds input was chosen twice as often by respondents who strongly disagreed that their section's pavement should be improved (Q58) as by those who strongly agreed [SD 23.6% vs. SA 9.1%]. Drivers who strongly agreed that their section's pavement was better than most others (Q59) were more than twice as likely to strongly agree that the Iowa DOT notes input vs. those who strongly disagreed [SA 29.8% vs. SD 11.4%]. Education was the only demographic item to bear significantly on Q53a. In this relationship choice of "somewhat agree" that the Iowa DOT considers drivers' input rose as drivers' education level (Q108) declined [from 19.5% for college graduates to 32.3% for the high school level respondents].

In summary, for the four trust questions, statistically-significant relationships were found mainly for driving-experience, pavement-belief, and satisfaction items. While the relatively positive position of the driving public with trust in the Iowa DOT is encouraging, it should be noted that the analysis reported here offers clues for even better relationships with Iowa drivers.

TRADE-OFF QUESTION CROSSTAB ANALYSIS

Included in the statewide survey were trade-off questions 69 through 81. While the preliminary analysis reported various discernible patterns in the survey responses of Iowa drivers, this final report focuses only on statistically-significant relationships employing the final sample of 384 respondents. The trade-off questions were cross-tabulated against the following groups of other survey questions: **1)** general driving-experience questions 3-5a; **2)** pavement belief questions 32-40; **3)** non-pavement questions 42-48; **4)** trust questions 51-53a; **5)** alternate route Q55; **6)** satisfaction questions 57-59; **7)** vehicle type questions 101-103; **8)**

annual mileage Q104; **9)** demographic questions 100, 108, 109 and 998b; and **10)** licenses, Q105 and 105a. To reiterate, the confidence level for statistical significance in Xtabs was 95 percent, and the test for strength of relationship was the Spearman Correlation Coefficient (SCC).

Q69

Do you think it is possible to build pavements in Iowa that would initially cost more to build but last longer while maintaining a good riding surface?

Of the 384 respondents, 312 (81.3%) answered "yes." Only one other survey question was significantly related to this first trade-off question. For total household income (Q109), the affirmative response percentage was slightly lower for drivers with household incomes $50,000 or more than for those under $50,000 [$50,000 or more, 87% vs. approx. 95% for those with incomes under $50,000]. Interestingly, the higher-income respondents were somewhat less willing to answer affirmatively.

Q70

Do you think that pavements in Iowa SHOULD be built to last longer?

Of the 312 drivers who answered Q70 (i.e., those who responded "yes" to Q69), 304 (97.4%) responded "yes"; only 5 drivers answered "no" (1.6%). Again, only one demographic item (Q108) was significantly associated with this trade-off question. For college graduates the affirmative answer percentage was slightly lower than for those with lower levels of education [94.3% for college graduates vs. approx. 99% for lower education levels]. The difference in this case, while statistically relevant, is not particularly notable, other than being consistent with the result for Q69.

Q71

If you knew it would cost more to build pavements to last longer, would you still want pavements in Iowa to be built to last longer?

Of the 306 motorists answering Q71 (i.e., those who answered "yes" or "depends" to Q70), 288 responded "yes", 7 answered "no", (94.1% vs. 2.3%). The Xtabs yielded no statistically-significant relationships for this trade-off.

Q72

Do you think the cost of building longer-lasting pavements should be paid by 1.) Raising more funds, or by 2.) Delaying some repairs on other pavements and tolerating a poorer ride on those pavements until funds are available?

Questions 72 and 73 addressed the issues of how to pay for pavement repairs and the priority of improvements. Almost three-fourths (73.6%) chose the option of raising more funds. As was the case before, only one demographic question was significantly associated with this trade-off item. With regard to gender (Q998b), female drivers selected "raise more funds" more often than did male drivers [F 85% vs. M 72.5%].

Q73

The Department of Transportation can use different strategies to improve the state's highway system. Which would you prefer? 1.) Providing an equally smooth ride on all highways, or 2.) Providing a better ride on more heavily traveled highways, while accepting a bumpier ride on less traveled ones.

Responses were evenly split, with 49.6% selecting "better ride" and 49.3% desiring "equal ride." For this trade-off, two demographic items came into play. As education levels increased (Q108), so too, did choice of "better ride" (BRH) [from 44.3% for high school to 60.7% for college graduates]. Gender (Q998b) entered in with male motorists choosing BRH more frequently than female drivers [M 56.9% vs. F 42%].

Q74

Pavements begin to wear as soon as they are built. Assuming costs were the same, would you prefer to resurface every 10 or 12 years and put up with frequent short construction delays, OR resurface every 18 to 20 years, REALIZING that pavements may be in poorer condition toward the end of that period?

1. 10 TO 12 YEARS
2. 18 TO 20 YEARS
8. DON'T KNOW
9. REFUSED

Questions 74 through 76 drew respondents further into specific pavement repair trade-offs. For Q74, 80.5 % chose 10-12 years, whereas 17.7% selected 18-20 years. Xtabs yielded no significant relationships.

It should be pointed out that this question was originally much longer, but was shortened after the pre-test. This yielded options of differing consequence. Hence, responses to the revised question should be weighed carefully and potentially revised for Phase III if deemed important.

Q75

If you had to make repairs on a 30 mile stretch of highway you regularly drive, would you choose: 1.) To repair 10 miles for each of the next three years, and tolerate shorter delays for each of these three years, or would you choose 2.) To repair all 30 miles of highway in one year, recognizing you may have to tolerate one, longer period of delays?

Three-fifths (60.4%) selected the 30 miles/one year option, with 38.5% going the other direction. The 30 miles/one year option was selected more often by drivers who agreed that they were comfortable pulling onto their section's shoulder (Q43) than by those who disagreed [A approx. 65% vs. D approx. 50%].

Q76

Would you design a construction project that caused a 30 minute DETOUR for drivers but only

lasted 2 months, or would you construct it so that it only caused drivers a 10 minute delay and no detour, but lasted 5 to 6 months?

Response frequencies for Q76 paralleled Q75 with 60.1% opting for the 10 minute delay. The 10 minute delay was chosen more often by respondents who were somewhat dissatisfied with their section's pavement (Q57) than by those who were somewhat satisfied [SWD 83.3% vs. SWS 59.3%]. Gender (Q998b) also entered in with male motorists choosing the 10 minute delay more frequently than female motorists [M 64.5% vs. F 53.8%].

Q77

If it normally took you 12 minutes to travel a 10 mile stretch of road, what would you consider a reasonable amount of time to travel the same 10 miles while under construction?

Question 77 was the first of four open-end items gauging the acceptability of travel time and speed limits in the construction zone. Reasonable travel time was grouped in three categories for analysis: < 20 mins. (21.4%), 20-25 mins. (65.4%) and 26+ mins. (12.5%). No significant relationships were found.

Q78

And what would you consider an unacceptable time to get through the same 10 mile work zone?

Responses to Q78 were categorized: < 25 mins. (11.7%), 25-30 mins. (45.3%), and 31+ mins. (41.1%). Again, no significant relationships surfaced.

Q78-Q77 (XSDELAY)

To facilitate response interpretation, an additional variable was created by subtracting responses to Q77 from those of Q78 to arrive at the excess delay factor "XSDELAY." XSDELAY frequencies were: < 10 mins. (26.8%), 10-19 mins. (44%), and 20+ mins. (29.2%). Cross-tabulating XSDELAY against the relevant survey variables yielded no significant relationships.

Q79

If 10 miles of rural two-lane highway are being reconstructed, and the normal speed limit is 55 MPH, what would you consider a reasonable speed limit through the 10 mile work zone?

Reasonable speed limits were condensed into three groups: < 30 mph (26.6%), 31-40 mph (52.6%), and 41+ mph (19%). Xtabs yielded no significant associations.

Q80

What speed would you consider unacceptably slow through the 10 mile work zone?

Unacceptable speed limits were grouped as: < 25 mph (51.9%), 25-35 mph (43%) and 36+ mph (3.4%). Significant relationships involved one pavement-belief item and one demographic question. Drivers who agreed that their vehicle had extra wear from driving on their section's pavement (Q32) tended more to report a speed limit < 25 mph (less tolerant)

than those who disagreed [A approx. 70% vs. D approx. 51%]. As education levels declined (Q108) intolerance of speed limits < 25 mph rose [from 44.7% for college graduates to 61.9% for high school graduates]. In other words, those with less education were more intolerant of low speed limits in work zones.

Q79-Q80 (SPDDROP)

An additional variable was in this case by subtracting responses to Q80 from those for Q79 to arrive at the speed limit drop "SPPDROP." SPDDROP frequencies were: 0-10 mph (37.8%), 11-19 mph (30.5%), and 20+ mph (31.8%). No significant relationships were found with SPPDROP via Xtabs.

Q81

If you only had a limited amount of money to spend on pavement repairs for a stretch of highway, and you had to choose between these five things, and you could pick only ONE, which would you choose: 1.) fixing a bumpy highway, 2.) correcting a noisy pavement, 3.) resurfacing a patched pavement, 4.) building a longer lasting pavement, or 5.) reducing construction delays?

Question 81, the final trade-off item, offered a series of options regarding ways to spend limited funds on pavement improvements. Response frequencies for the five choices were:

1.	fix ...	17.7%
2.	correct ...	1.8
3.	resurface ...	9.6
4.	build longer ...	54.0
5.	reduce ...	6.0

Three questions were significantly associated with this final trade-off item. For age (Q100), motorist 18-35 yrs. of age were somewhat less likely to choose "build longer-lasting highways" (BLH) than were those over 35 yrs. of age [48.7% for 18-35 vs. approx. 56% for those over 35 yrs. old]. Choice of BLH was somewhat less frequent for drivers of pickup trucks than for drivers of other vehicles [49% for pickup truck drivers vs. a range of 53% to 67% for other drivers]. Commercial driver licenses (CDL) were a factor with drivers with CDLs (Q105) much more likely to fix bumpy highways than were other drivers [CDL 40% vs. others 26.3%].

While the trade-off question Xtabs yielded fewer statistically-significant relationships than did the trust items, insights can nonetheless be gained from the resulting response patterns.

Table 1
Relationships Among Survey Variables

TRUST QUESTIONS	**Relation Variables**
The Iowa DOT is capable of doing a good job of pavement repair (Q51). [77.6% agree (SA or SWA)]	Respondents who strongly agreed that Iowa rural, two-lane highways (IRTH) have smooth riding surfaces (Q3) were more likely to strongly agree that the Iowa DOT is capable of doing a good job of pavement repair. Drivers who strongly agreed that IRTH pavements are in good condition (Q4) were much more likely to strongly agree that the Iowa DOT is capable. Selection of "somewhat agree" on the Iowa DOT's capability was twice as frequent for respondents who somewhat agreed that IRTH have pavements safe to drive (Q5) than for those who somewhat disagreed [SWA 53.7% vs. SWD 23.5%]. Choice of "somewhat agree" on the Iowa DOT's capability was three times as frequent for drivers who strongly agreed that IRTH pavements are very satisfactory (Q5a) vs. for those who strongly disagreed [SA 45.6% vs. SD 15.4%]. Drivers who somewhat disagreed that their vehicle had extra wear from driving on their section's pavement (Q32) were almost twice as likely to somewhat agree that the Iowa DOT is capable as those who somewhat agreed [SWD 59.5% vs. SWA 33.3%]. Selection of "somewhat agree" on the Iowa DOT's capability was over twice as frequent for respondents who strongly disagreed that their pavement section produced a bumpy ride (Q34) than for those who strongly agreed [SD 49.7% vs. SA 18.2%]. Drivers who strongly disagreed that their section's pavement was noisy (Q38) were more likely to strongly agree that the Iowa DOT is capable than were those who strongly agreed.

Choice of "somewhat agree" on the Iowa DOT's capability was almost twice as frequent for motorists who were very satisfied with their section's pavement (Q57) as for those who were very dissatisfied [Very Satisfied (VS) 46.3% vs. Very Dissatisfied (VD) 25%].

Respondents who strongly disagreed that their section's pavement should be improved (Q58) were much more likely to somewhat agree that the Iowa DOT is capable than were those who strongly agreed.

Drivers who strongly agreed that their section's pavement was better than most others (Q59) were much more likely to somewhat agree that the Iowa DOT is capable vs. those who strongly disagreed [SA 39.1% vs. SD 25%].

Selection of "strongly agree" on the Iowa DOT's capability was much more frequent for respondents who rated their vehicle's ride quality as "very good" (Q103) vs. the other respondents who chose other ratings ["very good" 47.7% vs. 23.5% or less for other rating categories].

Trust the Iowa DOT's judgement in scheduling pavement improvements (Q52). [64.1% agree]

Drivers who strongly agreed that IRTH have smooth riding surfaces (Q3) were four times as likely to strongly agree with this trust item as were those who strongly disagreed [SA 40.7% vs. SD 10.1%].

Motorists who strongly agreed that IRTH are in good condition (Q4) were almost three times as likely to strongly agree on trust vs. those who strongly disagreed [SA 43.6% vs. SD 15.4%].

Drivers who somewhat agreed that IRTH have pavements safe to drive (Q5) were twice as likely to somewhat agree with this trust item than were those who somewhat disagreed [SWA 46.5% vs. SWD 23.3%].

Selection of “strongly agree” on trust in the Iowa DOT’s judgement was almost three times as frequent for respondents who strongly agreed that IRTH pavements are very satisfactory (Q5a) as for those who strongly disagreed [SA 37.6% vs. SD 13.3%].

Motorists who strongly disagreed their vehicle had extra wear from driving on their section’s pavement (Q32) were more likely to strongly agree on trust vs. those who strongly agreed.

Respondents who strongly disagreed that pavement on their highway section produced a bumpy ride (Q34) were over twice as likely to somewhat agree on trust than were those who strongly agreed [SD 46.3% vs. SA 17.8%].

Choice of “strongly agree” on trust was more than twice as frequent for drivers who strongly disagreed that their section’s pavement was noisy (Q38) as for those who strongly agreed [SD 31% vs. SA 12.5%].

Motorists who strongly disagreed that their section’s pavement looked patchy (Q40) were much more likely to somewhat agree on trust than were those who strongly agreed (SD 44.3% vs. SA 25.4%].

Selection of “strongly agree” on trust was almost twice as frequent for respondents who strongly agreed that the scenery on their section was attractive (Q46) as for those who strongly disagreed [SA 31.5% vs. SD 16.7%].

Drivers who strongly agreed that they could easily find an alternate route (Q55) were twice as likely to strongly agree on trust as those who strongly disagreed [SA 35.2% vs. SD 16.8%].

Choice of “strongly agree” on trust was more than three times as frequent for respondents who were very satisfied with their section’s pavement (Q57) vs. for those who were very dissatisfied [VS 37.9% vs. VD 10.8%].

Motorists who strongly disagreed that their section's pavement should be improved (Q58) were twice as likely to strongly agree on trust as were those who strongly agreed [SD 34.2% vs. SA 16.5%].

Selection of "strongly agree" on trust was twice as frequent for drivers who strongly agreed that their section's pavement was better than most others (Q59) vs. those who strongly disagreed [SA 38% vs. SD 18.9%].

Respondents who rated their vehicle's ride quality as "poor" were much more likely to somewhat disagree on trust vs. other respondents who chose other ratings (Q103).

The Iowa DOT cares about the safety and convenience of Iowa drivers (Q53). [77.6% agree]

Drivers who strongly agreed that IRTH have smooth riding surfaces (Q3) were twice as likely to strongly agree that the Iowa DOT cares than were those who strongly disagreed [SA 55.6% vs. SD 26.9%].

Choice of "strongly agree" that the Iowa DOT cares was more than twice as frequent for respondents who strongly agreed that IRTH are in good condition (Q4) as for those who strongly disagreed [SA 64.6% vs. 25%].

Motorists who somewhat agreed that IRTH have pavements safe to drive (Q5) were much more likely to strongly agree that the Iowa DOT cares vs. those who somewhat disagreed [SWA 32.2% vs. SWD 18.8%].

Selection of "strongly agree" that the Iowa DOT cares was more than twice as frequent for drivers who strongly agreed that IRTH pavements are very satisfactory (Q5a) as for those who strongly disagreed [SA 57.3% vs. SD 23.1%].

Respondents who strongly disagreed that their vehicle had extra wear from driving on their section's pavement (Q32) were more likely to strongly agree that the Iowa DOT cares than were those who strongly agreed [SD 46.5% vs. SA 32.4%].

Drivers who strongly disagreed that pavement on their highway section produced a bumpy ride (Q34) were somewhat more likely to strongly agree that the Iowa DOT cares vs. those who strongly agreed [SD 46.3% vs. SA 37.2%].

Motorists who strongly disagreed that their section's pavement caused them to focus their attention on the pavement surface (Q36) were more likely to somewhat agree that the Iowa DOT cares than were those who strongly agreed [SD 39.5% vs. SA 26.4%].

Choice of "strongly agree" that the Iowa DOT cares was more than twice as frequent for respondents who strongly disagreed that their section's pavement was noisy (Q38) as for those who strongly agreed [SD 48.6% vs. SA 21.1%].

Drivers who strongly agreed that their section's pavement looked patchy (Q40) were twice as likely to strongly disagree that the Iowa DOT cares vs. those who strongly disagreed [SA 46.2% vs. 23.1%].

Motorists who strongly agreed that they were comfortable pulling onto the shoulder on their highway section (Q43) were twice as likely to strongly agree that the Iowa DOT cares as those who strongly disagreed [SA 57.3% vs. SD 27.7%].

Respondents who strongly agreed that the lines on their section were clear and easy to see (Q45) were more likely to strongly agree that the Iowa DOT cares vs. those who strongly disagreed.

Drivers who strongly agreed that the scenery on their section was attractive (Q46) were more likely to strongly agree that the Iowa DOT cares than those who strongly disagreed.

Selection of “strongly agree” that the Iowa DOT cares was more than twice as frequent for respondents who were very satisfied with their highway section’s pavement (Q57) as for those who were very dissatisfied [VS 56.5% vs. VD 22.2%].

Motorists who strongly agreed that IRTH are in good condition (Q4) were much more likely to strongly agree that the Iowa DOT heeds input than were those who strongly disagreed.

Choice of “strongly agree” that the Iowa DOT cares was more than twice as frequent for drivers who strongly agreed that their section’s pavement was better than most others (Q59) as for those who strongly disagreed [SA 57.6% vs. SD 25%).

The Iowa DOT considers input from Iowa drivers (Q53a).
[37.5% agree]

Respondents who strongly agreed that IRTH have smooth riding surfaces (Q3) were more than three times as likely to strongly agree that the Iowa DOT considers input from Iowa drivers as were those who strongly disagreed [SA 26.4% vs. SD 7.4%].

Motorist’s who strongly agreed that IRTH are in good condition (Q4) were much more likely to strongly agree that the Iowa DOT heeds input than were those who strongly disagreed.

Choice of “strongly disagree” that the Iowa DOT notes input was more than five times as frequent for drivers who strongly disagreed that IRTH pavements are very satisfactory (Q5a) as for those who strongly agreed [SD 42.9% vs. SA 7.3%].

Respondents who strongly agreed that their pavement section produced a bumpy ride (Q34) were more than three times as likely to strongly disagree than the Iowa DOT considers input vs. those who strongly disagreed [SA 27.9%vs. SD 6.6%].

Motorists who somewhat agreed that they were comfortable pulling onto their section's shoulder (Q43) were more than three times as likely to somewhat agree that the Iowa DOT notes input as those who somewhat disagreed [SWA 30.5% vs. SWD 7.7%].

Drivers who strongly agreed that the lines on their section were easy to see (Q45) were twice as likely to strongly agree that the Iowa DOT heeds input as those who strongly disagreed [SA 22.1% vs. SD 11%].

Motorists who strongly disagreed that their section's scenery was attractive (Q46) were more than twice as likely to strongly disagree that the Iowa DOT considers input as those who strongly agreed [SD 29.6% vs. SA 11.5%].

Respondents who strongly agreed that they could easily find an alternate route (Q55) were more than twice as likely to strongly agree that the Iowa DOT notes input vs. those who strongly disagreed [SA 23.8% vs. SD 11.1%].

Selection of "strongly disagree" that the Iowa DOT heeds input was more than four times as frequent for drivers who were very dissatisfied with their section's pavement (Q57) as for those who were very satisfied [VD 31.4% vs. VS 6.7%].

Motorists who strongly disagreed that their section's pavement should be improved (Q58) were more than twice as likely to strongly agree that the Iowa DOT considers input vs. those who strongly agreed [SD 23.6% vs. SA 9.1%].

Choice of "strongly agree" that the Iowa DOT notes input was more than twice as frequent for respondents who strongly agreed that their section's pavement was better than most others (Q59) as for those who strongly disagreed [SA 29.8% vs. SD 11.4%].

Selection of "somewhat agree" that the Iowa DOT considers input increased as drivers' level of education dropped (Q108) [from 19.5% for college graduates to 32.3% for high school level].

TRADE-OFF QUESTIONS

Cost more, last longer (Q69)
[of 384 respondents, 81.3% "yes"]

Affirmative answer percentage was slightly lower for respondents with household incomes $50,000 or more (Q109) [87% vs. approx. 95% for those with incomes under $50,000].

Built to last longer (Q70)
[of 312 respondents (yes to Q69) 97.4% yes]

Affirmative response percentage was slightly lower for drivers who were college graduates vs. those with less education (Q108) [94.3% for college graduates vs. approx. 99% for those with less education].

Cost more-still want (Q71)
[of 306 drivers (yes or depends for Q70) 94.1% yes]

Female motorists chose "raise more funds" more frequently than did male motorists (Q998b) [F 85% vs. M 72.5%]

How Pay/Improve

Raise more funds vs. delay repairs on other pavements (Q72)
[73.6% RMF]

Selection of "better ride" (BRH) increased along with the education levels (Q108) [from 44.3% for high school to 60.7% for college graduates]

Equal ride on all vs. better ride on heavily-traveled highways (Q73)
[49.6% BRH]

Male drivers selected BRH more often than did female drivers (Q998b) [M 56.9% vs. F 42%].

Repair Trade-Offs

Resurface every 10-12 years vs. every 18-20 years (Q74)
[10-12 years 80.5%]

Repair 10 miles over three years or 30 miles over one year (Q75)
[30 miles/one year 60.4%]

Respondents who agreed that they were comfortable pulling onto their section's shoulder (Q43) were more likely to choose 30 miles/one year than were those who disagreed [Agree (A) approx. 64% vs. disagree (D) approx. 50%].

30 minute detour/2 months vs.
10 minute delay/5+ months (Q76)
[10 minute delay 60.1%]

Motorists who were somewhat dissatisfied with their section's pavement (Q57) were more likely to opt for the 10 minute delay than were those who were somewhat satisfied [SWD 83.3% vs. SWS 59.3%].

Male drivers were more likely to select the 10 minute delay than were female drivers (Q998b) [M 64.5% vs. F 53.8%].

Acceptability of Travel
Time and Speed Limits

Reasonable travel time through work zone (Q77)

< 20 mins.	:	21.4%
20-25 "	:	65.4 "
26+ "	:	12.5 "

Unacceptable travel time (Q78)

< 25 mins.	:	11.7%
25-30 "	:	45.3 "
31+ "	:	41.1 "

XSDELAY = Q78-Q77

< 10 mins.	:	26.8%
10-19 "	:	44.0 "
20+ "	:	29.2 "

Reasonable speed limit for work zone (Q79)

< 30 mph	:	26.6%
31-40 "	:	52.6 "
41+ "	:	19.0 "

Unacceptable speed limit (Q80)

< 25 mph	:	52.9%
25-35 "	:	43.0 "
36+ "	:	3.4 "

Respondents who agreed that their vehicle had extra wear from driving on their section's pavement (Q32) were much more likely to report a speed limit < 25 mph (less tolerant) than were those who disagreed [A approx. 70% vs. D approx. 51%].

Intolerance of speed limits < 25 mph rose as education levels fell (Q108) [from 44.7% for college graduates to 61.9% for high school graduates].

SPPDROP = Q79-Q80

0 - 10 mph	:	37.8%
11-19 "	:	30.5
20+ "	:	31.8

Pavement Repair Options (Q81)

Choose one of these five:

17.7% 1) fix bumpy highway
1.8 " 2) correct noisy pavement
9.6 " 3) resurface patched pavement
54.0 " 4) build longer-lasting
6.0 " 5) reduce repair delays

Motorists 18-35 yrs. of age (Q100) were somewhat less likely to select "build longer-lasting highways " (BLH) than were those over 35 yrs. of age [48.7% for 18-35 vs. approx. 56% for those over 35 yrs. old].

Selection of BLH was somewhat less frequent for drivers of pickup trucks (Q101) vs. drivers of other vehicles [49% for pickup truck drivers vs. a range of 53% to 67% for other drivers].

Respondents with commercial driver licenses (CDL) were much more likely to fix bumpy highways than were other respondents (Q105) [CDL 40.0% vs. others 26.3%].

PART II: THE RELATIONSHIP OF PAVEMENT QUALITY WITH DRIVER SATISFACTION

INTRODUCTION

There are three objectives to part two of this report. Each objective will be presented in a separate section. The first objective is to describe the sample with regard to the physical pavement data and three measures of driver satisfaction. In this section, the proportion of respondents who are satisfied with pavements on two-lane, rural, state highways will be examined and the distribution of pavement condition and roughness indices will presented. The second objective is to describe the relationship between physical pavement characteristics and driver satisfaction. This includes describing both the magnitude of relationship as well as the shape of the relationship. The final objective is to test formally the extent to which Expectancy-Value theory (Fishbein & Ajzen, 1975) explains this relationship between satisfaction and physical pavement characteristics. This theory will be explained under objective three.

OBJECTIVE 1:
DESCRIBING DRIVER SATISFACTION AND PHYSICAL PAVEMENT CHARACTERISTICS

Respondents were asked how much they agree or disagree with three statements about the quality of a selected section of state highway pavement on which they drive regularly. The distribution of responses can be seen in **Table 1.1**. In summary, 75% percent of respondents strongly agreed or agreed that they were satisfied with the pavement. Fifty-four percent of respondents strongly agreed or agreed that the pavement was better than most stretches of state highway. Forty percent of the sample said that the pavement on their identified stretch of highway should be improved.

Table 1.1: Frequency and percent of respondents who agreed or disagreed with three satisfaction assessment (threshold) statements

Value Label	Value	Frequency	Percent
Q57. I AM SATISFIED WITH THE PAVEMENT ON THIS SECTION OF HIGHWAY			
STRONGLY DISAGREE	1	35	10.5
SOMEWHAT DISAGREE	2	33	9.9
FEEL NEUTRAL	3	16	4.8
SOMEWHAT AGREE	4	108	32.5
STRONGLY AGREE	5	140	42.5
	Total	332	100.0
Q58. THE PAVEMENT ON THIS STRETCH OF HIGHWAY SHOULD BE IMPROVED			
STRONGLY DISAGREE	1	81	24.4
SOMEWHAT DISAGREE	2	80	24.1
FEEL NEUTRAL	3	40	12.0
SOMEWHAT AGREE	4	58	17.5
STRONGLY AGREE	5	73	22.0
	Total	332	100.0
Q59. THE PAVEMENT ON THIS STRETCH OF HIGHWAY IS BETTER THAN MOST OF THE STRETCHES OF STATE HIGHWAYS I'VE DRIVEN ON RECENTLY IN IOWA.			
STRONGLY DISAGREE	1	35	10.5
SOMEWHAT DISAGREE	2	38	11.4
FEEL NEUTRAL	3	81	24.4
SOMEWHAT AGREE	4	86	25.9
STRONGLY AGREE	5	92	27.7
	Total	332	100.0

Three physical pavement measures were analyzed for this report. International Roughness Index values typically range from 0 to 5 with higher values indicating a rougher pavement surface. The minimum and maximum IRI values for the highways identified by respondents in the sample were .70 and 5.10, respectively. **Table 1.2** presents a scale to facilitate interpretation. The mean IRI value of the sample was 1.98, with a standard deviation of .75. The median IRI value was 1.93. The distribution of IRI values was positively skewed, suggesting that a proportionately greater number of highways with lower IRI values (i.e., better rides) were sampled. The mean and median IRIs of Iowa's entire highway system are 1.98 and 1.91 respectively.

Table 1.2: IRI Interpretive Categories
(as provided by Iowa DOT)

Range	*Interpretive Category*
0.00 to 1.4	Very Good
1.41 to 2.2	Good
2.21 to 3.0	Fair
3.01 to 3.80	Poor
> 3.81	Very Poor

Physical Condition Index (PCI) values range from 0 to 100 with higher values indicating better pavement condition. The minimum and maximum PCI values for highways in the sample were 29 and 89, respectively. **Table 1.3** presents a scale to facilitate interpretation. The mean PCI value of the sample was 67 with a standard deviation of 13. The median PCI value was 68. The mean and median PCI values of Iowa's entire highway system are 66.4 and 67.0 respectively. The distribution of PCI values was approximately normally distributed, suggesting that a roughly equal proportion of highways in excellent to fair condition were sampled. Relatively few roads of poor quality were sampled.

Table 1.3: PCI Interpretive Categories
(as provided by Iowa DOT)

Range	*Interpretive Category*
100 to 80	Excellent
79 to 60	Good
59 to 40	Fair
39 to 0	Poor

The last physical measure to be analyzed in this report is the square meters of patched pavement per half mile. This variable will hereafter be referred to as PATCH. The minimum and maximum values for highways in the sample were 0 and 1905, respectively. The mean PATCH value of the sample was 137 with a standard deviation of 322. The distribution of PATCH values was heavily positively skewed, suggesting that a greater number of highways with lower PATCH values were sampled. In fact, 31% of the highways included in the sample had a value of zero (i.e., no patching). The distributional non-normality of this variable makes it less ideal as a pavement index than the PCI or IRI. If the Iowa DOT is interested in the PATCH variable as a pavement index, Phase III of this study should attempt to preselect a sample of highways that would minimize the number of highways that are free of patches.

OBJECTIVE 2:
DESCRIBING THE RELATIONSHIP BETWEEN PAVEMENT CHARACTERISTICS AND DRIVER SATISFACTION

Having examined respondents' answers to the satisfaction questions and having described the physical data for the highway segments identified by respondents, the second objective of this study is to describe the relationship between these two sets of variables. The fundamental question of when drivers are satisfied with the condition of the pavement surface has important policy implications — namely, what distress and roughness levels are tolerated by the public? This question was investigated by relating IRI, PCI and PATCH values to the cumulative percent of respondents who agreed with each the three satisfaction questions (Q57, Q58, and Q59). This way the researchers were able to answer questions such as "at what IRI value might we expect 80% of drivers to be satisfied with a given section of highway?" For this analysis, the three measures of satisfaction were recoded into an agree-disagree format, such that responses of "strongly agree" and "agree" were combined and together coded as "1" and responses of "feel neutral," "disagree" and "strongly disagree" were combined and together coded as "0." **Table 2.1** presents pavement quality cutoff values (PCI, IRI, and Patch) as related to the question "I am satisfied with the pavement on this section of highway." For this analysis, physical data were ranked (i.e., from low values to high values) for respondents who agreed with the three satisfaction questions. For each pavement index, three separate distributions were generated, one for each satisfaction measure. Using these distributions, we can pinpoint key pavement index values as a function of the cumulative percent of the sample that agrees with each of the satisfaction questions. **Table 2.2** presents pavement quality cutoff values as related to the questions asking whether a highway segment is better than most and whether a highway segment should be improved. By looking at the IRI values in these tables, it can be seen that the values are substantially lower than the cutoff currently used by the State of Iowa to recommend pavement repair. In other words, roads had to be in the "very good" range before a majority of respondents reported being satisfied with the pavement. With this response pattern, one might expect a large number of respondents to report that highways need improvement. Yet, even when pavement conditions were poor (IRI values greater than 3.01) only 35% of the sample agreed or strongly agreed that the pavement should be improved. A similar pattern was observed for PCI. Road condition had to be good or excellent (PCI greater than or equal to 76) for a majority of respondents to be satisfied, yet only 40% of the sample agreed or strongly agreed that the pavement should be improved. These results indicate that, even though a majority of drivers are not satisfied with pavement surfaces in only "fair" condition, they are nonetheless willing to forgo improvement. Although the researchers can only speculate as to the respondents' reasoning, it is likely that they may be considering the additional road construction delays they would encounter or the additional costs to taxpayers if the roads were improved. Their thinking might be similar to that of a person who has a slight toothache but is still not hurting enough to visit the dentist. Clearly, this response pattern should be studied more closely in phase III. For illustrative clarity, these data are graphed in **Figures 2.1** through **2.3**.

It should be noted that the physical cutoff values in Tables 2.1, 2.2 and 2.3, as well as the data graphed in Figures 2.1, 2.2 and 2.3 are sensitive to, and largely determined by the distribution of scores of the pavement indices (especially the range). To illustrate this point,

consider the following example. If Iowa had only roads in excellent condition (PCI 80 to 100) and only these roads were sampled, it would appear (in the graphs and charts in this report) that respondents had high expectations and "needed" roads of excellent condition to be satisfied. In other words, the methods used here to determine satisfaction thresholds are influenced by the sample of highways. A reasonably normal distribution with a large range is ideal for these analyses. The distributions look reasonably normal and the results should be considered to be good initial estimates. There are, however, the following exceptions. PCI looks as if it has a narrow range with a relative under sampling of roads in poor condition. As noted previously, nearly a third of the highways sampled were free of patches. Consequently, graph 2.3 might be erroneously interpreted as respondents having extremely high expectations and "needing" patch-free roads for even 35% of the sample to be satisfied. Also, approximately a dozen heavily patched roads (i.e., with values greater than 1000 m^2/half mile) have influenced the cutoff values indicating when respondents feel roads need to be improved.

Phase III should include controls that ensure an approximately even sampling of roads at all levels (i.e., interpretive categories) of pavement indices. This would effectively eliminate the possibility that the satisfaction cutoffs have been influenced by, or are a product of the roads sampled.

Table 2.1:
At what roughness and distress cutoffs do 20%, 30%, 40%, 50%, 60% and 70% of respondents agree with the following statement:
(Q57) I am satisfied with the pavement on this section of highway.

(74% agreed with this statement overall.)

Pavement Measure	SATISFIED WITH PAVEMENT (Cumulative Percents) 20%	30%	40%	50%	60%	70%
IRI	**2.32**	**1.99**	**1.65**	**1.38**	**1.22**	**.91**
Range estimate 1	(2.16 - 2.38)	(1.81 - 2.12)	(1.54 - 1.78)	(1.31 - 1.49)	(1.15 - 1.27)	(.70 - 1.08)
Range estimate 2	(2.24 - 2.40)	(1.91 - 2.07)	(1.57 - 1.73)	(1.30 - 1.46)	(1.19 - 1.35)	(.83 - .99)
PCI	**62**	**66**	**72**	**76**	**79**	**86**
Range estimate 1	(59 - 64)	(64 - 68)	(69 - 74)	(74 - 78)	(78 - 80)	(81 - 89)
Range estimate 2	(61 - 63)	(65 - 67)	(71 - 73)	(75 - 77)	(78 - 80)	(85 - 87)
PATCH	**61**	**18**	**3**	**0**	**0**	**0**
Range estimate 1	(32 - 123)	(11 - 26)	(0 - 8)	(0 - 2)	(0 - 2)	(0 - 2)
Range estimate 2	(26 - 96)	(0 - 53)	(0 - 38)	(0 - 35)	(0 - 35)	(0 - 35)

Range estimate 1 = 95% confidence interval based on standard error of satisfaction measures.
Range estimate 2 = 95% confidence interval based on standard error of pavement measures.

Table 2.2:
At what roughness and distress cutoffs do 10%, 20%, 30%, 40% and 50% of respondents agree with the following statements:

(Q59) The pavement on this stretch of highway is better than most of the stretches of state highways I've driven on recently in Iowa.
(54% of respondents agreed overall.)

(Q58) The pavement on this stretch of highway should be improved.
(40% of respondents agreed overall.)

Pavement Measure	PAVEMENT BETTER THAN MOST (Cumulative Percent) 10%	30%	50%	PAVEMENT NEEDS IMPROVEMENT (Cumulative Percent) 10%	20%	30%
IRI	**2.59**	**1.64**	**.96**	**1.65**	**2.14**	**2.68**
Range estimate 1	(2.37 - 2.77)	(1.75 - 1.54)	(.70 - 1.12)	(1.49 - 1.77)	(2.01 - 2.28)	(2.48 - 2.77)
Range estimate 2	(2.51 - 2.67)	(1.56 - 1.72)	(.88 - 1.04)	(1.57 - 1.73)	(2.08 - 2.22)	(2.60 - 2.76)
PCI	**58**	**73**	**86**	**73**	**66**	**52**
Range estimate 1	(51 - 61)	(69 - 75)	(81 - 89)	(69 - 76)	(64 - 68)	(49 - 58)
Range estimate 2	(57 - 59)	(72 - 74)	(85 - 87)	(72 - 74)	(65 - 67)	(51 - 53)
PATCH	**153**	**3**	**0**	**0**	**23**	**195**
Range estimate 1	(96 - 271)	(0 - 6)	(0 - 2)	(0 - 2)	(16 - 50)	(153 - 315)
Range estimate 2	(118 - 188)	(0 - 38)	(0 - 35)	(0 - 37)	(0 - 58)	(160 - 230)

Range estimate 1 = 95% confidence interval based on standard error of satisfaction measures.
Range estimate 2 = 95% confidence interval based on standard error of pavement measures.

Figure 2.1:
At what IRI values did X% of respondents agree with the following three questions?

I am satisfied with the pavement on this section of highway.

The pavement on this stretch of highway is better than most of the stretches of state highways I've driven on recently in Iowa.

The pavement on this stretch of highway should be improved.

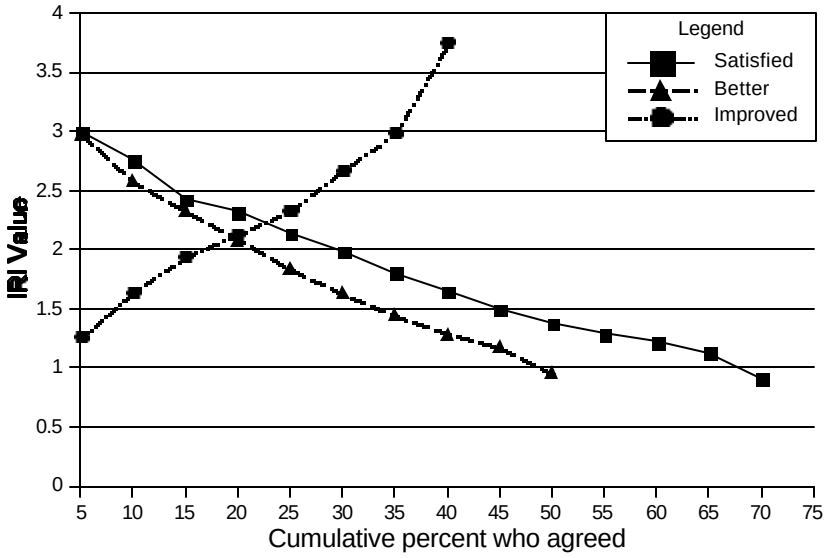


Figure 2.2: At what PCI values did X% of respondents agree with the following three questions?

I am satisfied with the pavement on this section of highway.

The pavement on this stretch of highway is better than most of the stretches of state highways I've driven on recently in Iowa.

The pavement on this stretch of highway should be improved.

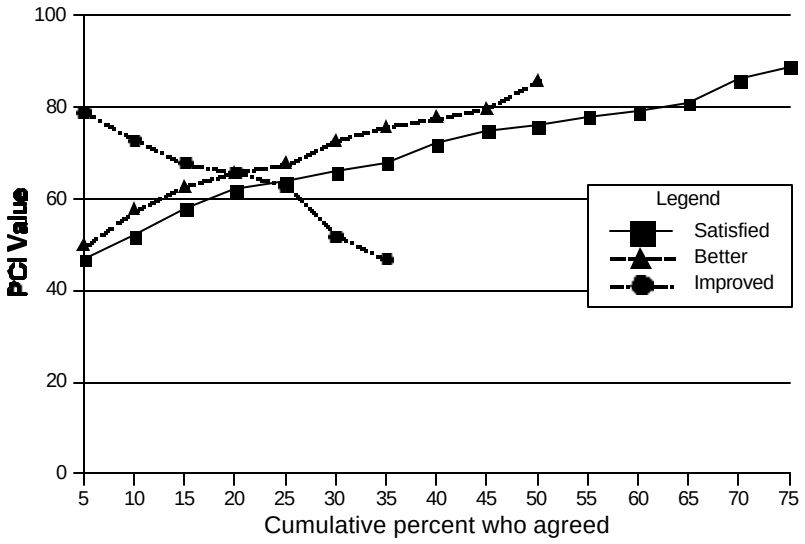
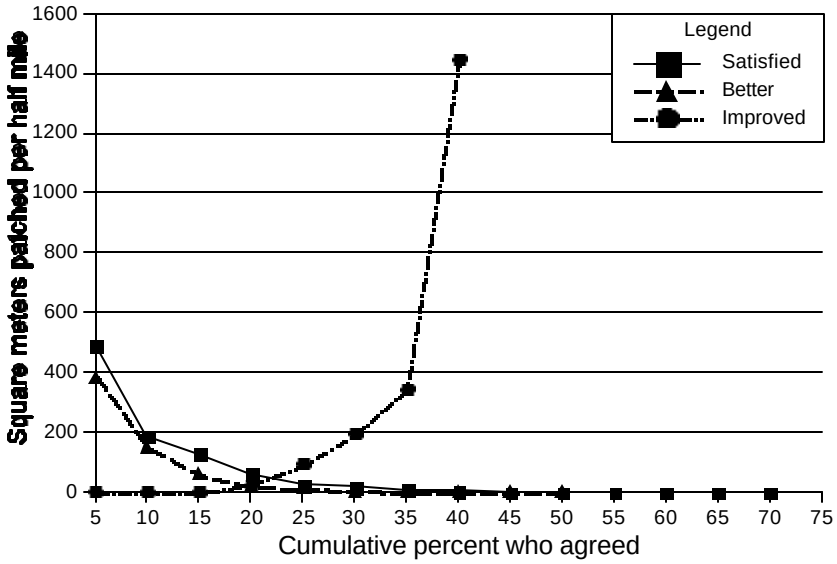


Figure 2.3:
At what Patch values did X% of respondents agree with the following three questions?

I am satisfied with the pavement on this section of highway.

The pavement on this stretch of highway is better than most of the stretches of state highways I've driven on recently in Iowa.

The pavement on this stretch of highway should be improved.



Another way of examining the relationship between driver satisfaction and physical indices of pavement condition and roughness is to look at the zero-order (i.e., uncontrolled) correlations between these two variables. **Table 2.3** presents the relationships between these variables, including an overall index of "satisfaction" — the summation of the three "threshold" measures of satisfaction with pavement conditions:

- "I am satisfied with the pavement on this section of highway" (Q57);
- "The pavement on this section of highway should be improved" (Q58, reverse coded);
- "The pavement on this stretch of highway is better than most of the stretches of state highways I've driven recently in Iowa"(Q59).[1]

Respondents indicated their agreement or disagreement with each item on a five-point, Likert-type scale. Reliability (Cronbach's alpha)[2] for the unidimensional satisfaction index is a satisfactory .82. Higher scores represent greater satisfaction. The satisfaction index should have a negative zero-order (i.e., uncontrolled) relationship with IRI and Patch because higher scores on these indices represent poorer pavement conditions. In contrast, the satisfaction index should have a ***positive*** zero-order (i.e., uncontrolled) relationship with PCI because higher scores on this index represent better pavement conditions.

As can be seen in Table 2.3, the satisfaction index is approximately equally well correlated with all three measures of physical pavement characteristics. All relationships were significant in the predicted direction. The magnitude of the relationship between satisfaction and pavement indices can be characterized as small to moderate. Roughly 5 percent of the variance in satisfaction was predicted by physical pavement characteristics.

[1]The wording of this item is clumsy and should be improved in future studies. Most people will probably have trouble with the mental discounting required to quickly sort out state highways from other highways for comparison purposes.

[2]Cronbach's alpha (%) is a measure of the internal consistency of an index or summated scale that ranges from a low of zero to a high of 1.00. The stronger the positive correlation among the items that comprise the scale, the higher the internal consistency of the scale, the higher the Cronbach's alpha value, and the lower the measurement error in the index. Generally, acceptable alpha values are .5 or above and superb values are .8 or above. Cronbach's alpha is a standard measure of instrument reliability.

Table 2.3: Pearson r (zero-order) correlations between satisfaction measures and indices of physical roughness and distress

	Physical Pavement Measure		
	IRI	**PCI**	**PATCH**
(Q57) I AM SATISFIED WITH THE PAVEMENT ON THIS SECTION OF HIGHWAY.	**-.19*** **	**.21*** **	**-.20*** **
(Q58) THE PAVEMENT ON THIS STRETCH OF HIGHWAY SHOULD BE IMPROVED.	**.23*** **	**-.20*** **	**.20*** **
(Q59) THE PAVEMENT ON THIS STRETCH OF HIGHWAY IS BETTER THAN MOST OF THE STRETCHES OF STATE HIGHWAY I'VE DRIVEN ON RECENTLY IN WISCONSIN.	**-.14***	**.16****	**-.16****
SATISFACTION INDEX (THREE QUESTIONS COMBINED, WITH Q58 REVERSE-CODED)	**-.23*** **	**.22*** **	**-.22*** **

Significance key: * p#.05 ** p #.01 ***p# .001

OBJECTIVE 3:
DEVELOPING AND TESTING OF "THE MODEL"--
EXPLORING THE PATH BETWEEN PAVEMENT CHARACTERISTICS AND DRIVER SATISFACTION

A psychological theory was needed to explain the relationship between physical pavement characteristics and variation in driver satisfaction. That is, drivers may vary in their satisfaction with the same stretch of pavement. To understand the relationship between the physical characteristics of the pavement and motorists' satisfaction with the pavement, we adapted relevant aspects of Fishbein's attitude model and Ajzen's Theory of Planned Behavior. Both models propose that a person's attitude toward an object or behavior is based on a limited set of salient beliefs (usually 5 - 9 beliefs) that the individual has toward that object or behavior. Each belief associates the object or behavior with a specific attribute or outcome. In addition, each attribute or outcome is usually evaluated as positive or negative (e.g., a good outcome or a bad outcome). In general, people develop favorable attitudes when good outcomes are likely and bad outcomes are unlikely. They develop bad attitudes when bad outcomes are likely and good outcomes unlikely.

For example, a person's overall positive or negative attitude toward taking a vacation trip might be based on what he or she associates with the trip (e.g., would it probably be costly? relaxing?) adjusted by whether each outcome is seen as bad or good (e.g., is a costly trip a good one or a bad one?). A person mentally weighs the set of beliefs and evaluations (known collectively as "**cognitive structure**") to develop an overall attitude toward taking the trip. Beliefs and evaluations are formed by prior experience, information gained from others, and by inferences a person draws from experience and information.

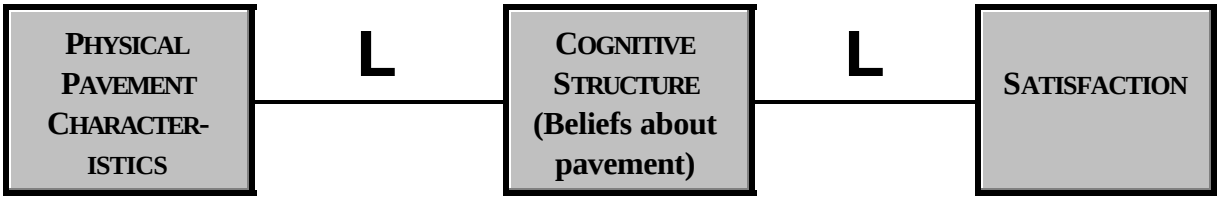
The Theory of Planned Behavior (an extension of expectancy-value theory) has been used to assess drivers' attitudes toward specific driving violations (Parker, Strandling & Manstead, 1992, 1995, 1996). Griffeth and Rogers (1976) used expectancy-value theory in studying the effects of accident scene gruesomeness on student driver performance in driving simulators. Expectancy-value theory has never been used to examine peoples' perceptions of pavement quality.

A review of the literature on drivers' perceptions of road safety and ride quality indicate **(1)** that the antecedents to pavement satisfaction are likely to be complex and **(2)** that it is important to include an array of variables — not just perceptions of pavement surface — that may explain variation in pavement satisfaction. Stewart, Young and Healey (1979), for example, found that drivers' ratings of road smoothness were affected by "extraneous sensory input" — such as the radio. Riemersma (1988) examined the links between road features and drivers' subjective evaluations of road safety and found that some features have little effect on drivers' ratings. And finally, Mahalel and Szernfeld (1986) suggest that roads engineered to improve safety may have a paradoxical effect by encouraging driver inattention, producing an effect of "diminishing returns" theory of road improvement.

In the highway pavement project we are interested in the extent to which a motorist's attitude toward driving along a stretch of rural, two-lane state highway is based on characteristics of the pavement itself that he or she perceives and can have beliefs "about." **Figure 3.1** illustrates the hypothesized ordering of these variables (physical pavement characteristics, cognitive structure as composed of salient beliefs about the act of driving on the pavement, and attitude operationalized as satisfaction with pavement characteristics). Knowing what motorists believe about the pavement will help policy makers determine what aspects of pavement quality are perceived by motorists and how those perceptions drive satisfaction with pavement quality.

Physical pavement characteristics. Physical pavement characteristics are operationalized as the PCI, IRI and Square meters of pavement patched per half mile in the Iowa analysis. The measures are used separately in statistical analyses.

Figure 3.1: Cognitive structure as intervening variable between physical pavement characteristics and satisfaction with pavement characteristics



Satisfaction. Satisfaction, as noted previously, is operationalized as the summation of the three "threshold" measures of satisfaction with pavement conditions. Question 58 was reverse coded for this index.

Pavement beliefs and cognitive structure. To ascertain salient beliefs that motorists have about pavement conditions, the subcontractor Wisconsin Survey Research Laboratory conducted a series of focus groups around the state. Employing an open-ended technique such as focus groups to reveal salient beliefs is the standard procedure used in studies employing the Fishbein and Ajzen models. Analysis of focus group transcripts revealed the following five dimension of belief which were then turned into Likert-type items in the questionnaire:

- "Driving on the pavement on this section of highway causes extra wear on my vehicle's suspension system" (Q32);
- "Driving on the pavement on this section of highway produces a bumpy ride" (Q34);
- "Driving on the pavement on this section of highway causes me to focus my attention on the pavement surface" (Q36);

"Driving on the pavement on this section of highway is noisy" (Q38);

"The pavement on this section of highway looks patchy" (Q40).

The five measures were summed to produce a single, unidimensional scale of cognitive structure with a superb reliability (Cronbach's alpha) of .89. Higher scores represent beliefs that the pavement is of*lower* quality along the dimensions noted. Therefore, cognitive structure should be positively related to IRI and PATCH, and negatively related to PCI. Cognitive structure should also be negatively related to satisfaction. Since each belief in this study is negatively valenced (i.e., biased) for most people (for example, very few people are likely to rate a bumpy ride as "good"), the evaluative measures for each belief were removed from the questionnaire after initial pretesting revealed that they were not worthwhile. Personal correspondence with Icek Ajzen, the author of the model upon which much of this analysis is based, confirmed that it is okay to leave out the evaluative measures if each belief is strongly valenced to the good or bad for most people.

One question to consider is whether the set of beliefs derived from the focus groups represent all of the meaningful salient beliefs that people can form about a pavement segment. In short, are there other beliefs about the pavement which have not been revealed through the focus groups and which can still affect a person's satisfaction with pavement conditions? Similarly, do the physical measures adequately translate into beliefs (e.g., are there characteristics of the pavement captured by the physical measures and observed by motorists that affect satisfaction but that have not been revealed through the focus groups and questionnaires)?

A final answer to those questions will require further research. However, to a very large extent, the comprehensiveness of the set of beliefs will be revealed through path analysis. If research proceeded correctly and the model is correct, then any zero-order, statistically significant relationship

between physical pavement characteristics and satisfaction should be reduced to near zero and non-significance when cognitive structure is introduced as an intervening variable. A significant relationship between pavement characteristics and cognitive structure should remain, as should a significant relationship between cognitive structure and satisfaction. If these patterns occur, then:

The model is correct in proposing that cognitive structure mediates the relationships between physical characteristics and satisfaction, and

There are *no* residual (unmeasured) beliefs lurking in respondents' minds that affect satisfaction and that are based on the physical characteristics measured by PCI, IRI, and

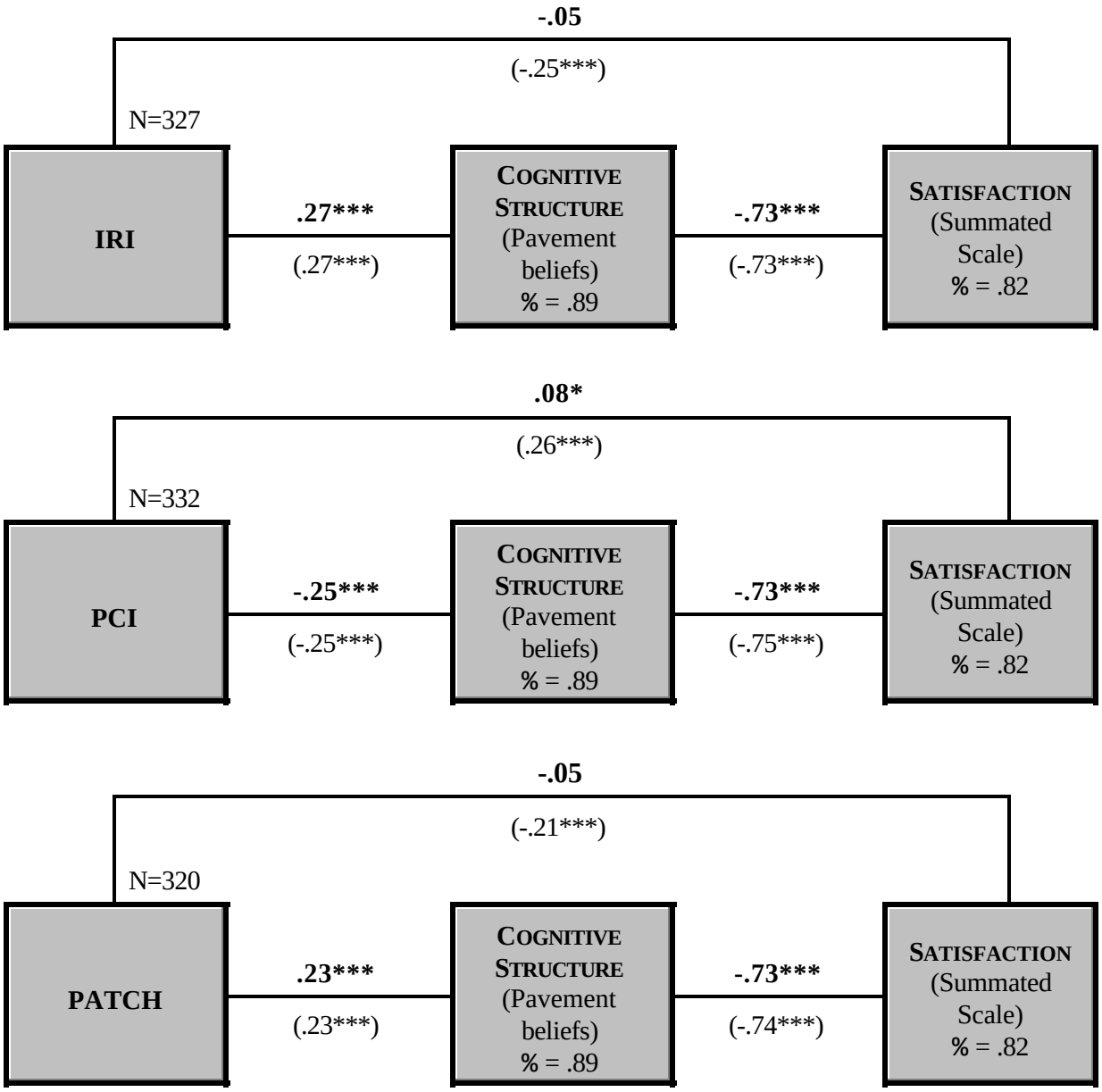
PATCH scores. (Any remaining relationship between physical characteristics and satisfaction would have to be based on beliefs that people in fact hold about the pavement but that have not been captured by the set of beliefs that make up cognitive structure.)

Cognitive structure as intervening variable. The path analyses illustrated in **Figure 3.2** indicate that cognitive structure does indeed mediate between pavement characteristics and satisfaction, using each of the three measures of pavement characteristics. For example, the statistically significant, zero-order (original) relationship between IRI and satisfaction (beta = -.25, p#.001) diminishes to near zero (beta = -.05, ns) when cognitive structure is entered into the path analysis as an intervening variable. The relationship between IRI and cognitive structure remains positive and significant, as does the relationship between cognitive structure and satisfaction. The beliefs that comprise cognitive structure also seem to be reasonably comprehensive, at least to the extent that they intercept the beliefs that people can derive from the physical characteristics of the pavements as measured by PCI, IRI, and PATCH.

Even though the first-order relationship (i.e., the relationship as controlled by one variable) between cognitive structure and satisfaction (beta= -.73, p# .001) is remarkably strong, there is still some variance in satisfaction (about half) not explained by cognitive structure and pavement characteristics. Some unexplained variance is certainly error stemming from measurement error and sampling error, although the amount of measurement error in the cognitive structure and satisfaction indices is reasonably small, judging from their reliabilities. Further analysis, to be shown later, will introduce some variables that may account for some of the unexplained variance as well as some of the relationship between cognitive structure and satisfaction. Then this study will analyze the relationships between the individual items that comprise cognitive structure and satisfaction to get a better idea of which beliefs appear to affect satisfaction the most. There still remains the possibility that some untapped pavement beliefs account for a measure of satisfaction. This is especially true of the relationship between PCI and satisfaction because the current set of beliefs did not fully mediate the relationship (reduce it to below significance). Such beliefs might not be associated with any of the pavement characteristics measured by PCI, IRI, or PATCH indices.

Although the relationships between the physical pavement measures and cognitive structure are significant, they are somewhat small, accounting at best for only 7% of the variance in cognitive structure. (The reliability of the physical pavement measures is assumed to be high.) As with the relationship between the items that comprise cognitive structure and satisfaction, further analysis will examine the relationships between each of the physical pavement measures and the components of cognitive structure to try to diagnose the reasons for the magnitude of these relationships.

Figure 3.2: Path analysis —
Cognitive structure as intervening variable
between physical pavement characteristics and satisfaction
(zero-order beta) **Path Coefficient**



Two-tailed significance key: * p#.05 ** p# .01 *** p# .001

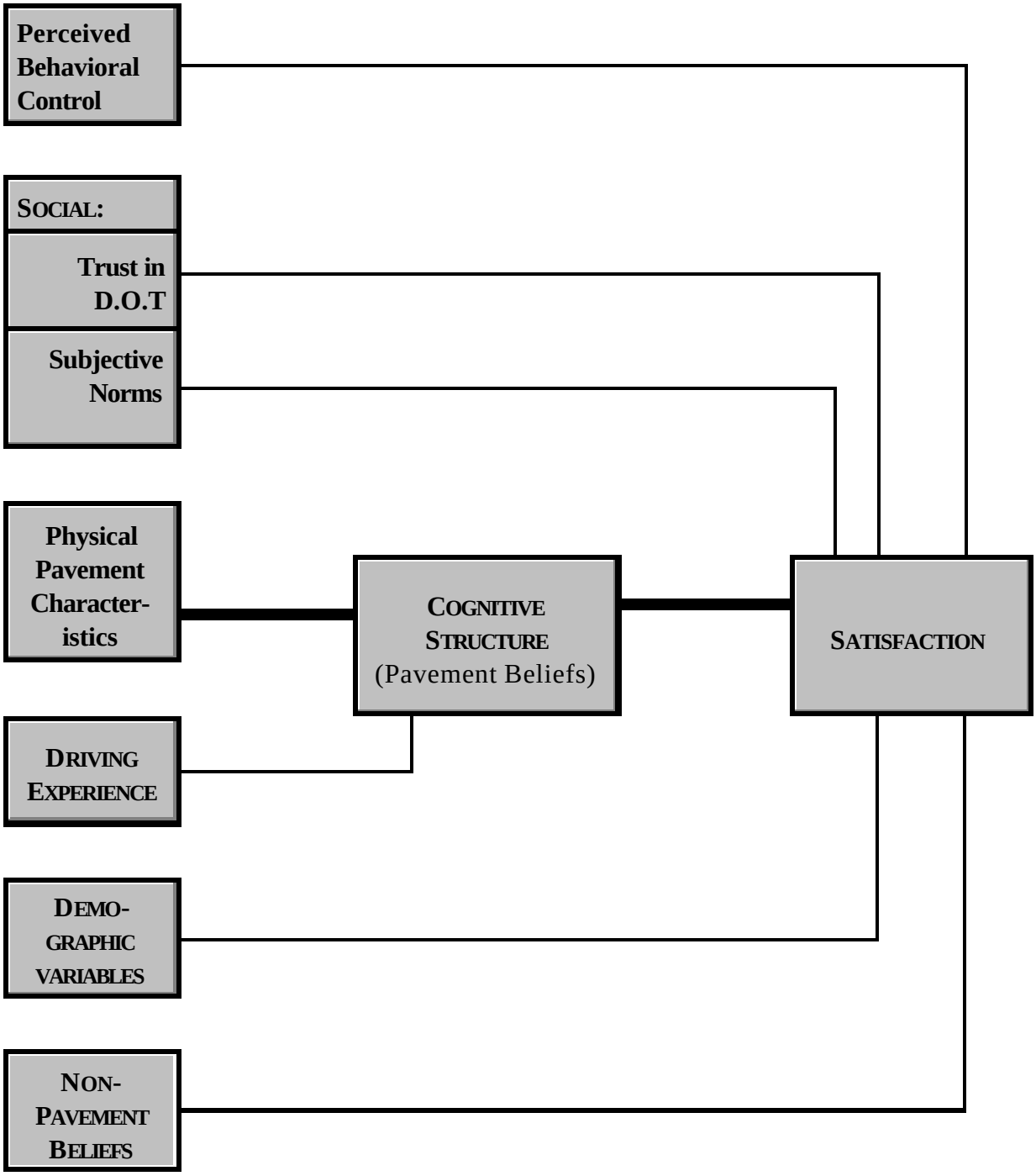
Other predictors

As illustrated in **Figure 3.3**, we expected some other variables to contribute to cognitive structure and satisfaction and perhaps serve as third-variable controls.

Perceived Behavioral Control (PBC). Adapted from Ajzen's model, we expected that perceived behavioral control could affect satisfaction. PBC reflects the amount of control or voluntariness in a given behavior — in this case, driving along the stretch of highway in question. Although PBC is usually a predictor of behavior and not of an attitude in the Ajzen formulation, it was reasoned that motorists' responses to highway pavement conditions might be affected by whether or not they could choose an alternate route to travel. To measure PBC, responses were gathered on five-point, Likert-type scales to this item (Q55): "If I wanted to, I could easily find a convenient alternate route to the places I usually go instead of using this stretch of highway."[3] Higher scores represent greater control.

[3] Another PBC "Most trips I have to take" was dropped because it produced a low reliability score when combined with the other PBC (Q56) and because it showed little correlation with other variables in the analysis.

Figure 3.3:
Hypothesized predictors of satisfaction with pavement conditions



Social variables: Subjective norms and trust. Two variables reflecting social relationships — subjective norms and trust in the state department of transportation — might also affect satisfaction.

Also adapted from Ajzen's model, subjective norms (SN) reflect felt social pressures, specifically, what a person believes others think he or she should do. In adapting this measure from being a predictor of behavior to a predictor of attitude (satisfaction), the wording became: "Most people whose opinions are important to me think that it is OK for me to drive this stretch of highway" (Q59a). It was reasoned that a person's own attitude could be affected by others who matter to him or her, especially if they express concern over the person's driving on a given stretch of road. Higher scores on this Likert-scaled item represent stronger agreement with the item.

Trust in the department of transportation might also affect satisfaction, at least by mitigating any anger that might be produced by driving along stretches of road with deteriorating pavement conditions. Trust was ascertained by summing respondent answers to four Likert-scaled items (Cronbach's alpha = .68):

- "The state DOT is capable of doing a good job of fixing and replacing pavements on rural highways in Iowa" (Q51);
- "I trust the judgment of the state DOT when it comes to scheduling pavement improvements" (Q52);
- "State DOT officials care about the safety and convenience of drivers on this stretch of road" (Q53);
- "The DOT considers input from people like me when making decisions about repairs or improvements to this stretch of highway" (Q53a).

Driving experience. A person's sensitivity to pavement conditions, and therefore his or her beliefs about pavement conditions, could be affected by his or her driving experience. Four separate variables were used to reflect this experience: miles driven per year (Q104), frequency of driving a motorcycle (derived from Q105b), the frequency of driving along the specific stretch of highway in question (Q28a), and the self-reported quality of ride of his or her vehicle (Q103).

Non-pavement beliefs. Focus groups transcripts also revealed other salient beliefs people hold about the environment they experience when driving along a stretch of highway that are not based on physical pavement characteristics. These beliefs might affect a person's satisfaction when driving. Responses were gathered via Likert-type scales to indicate whether the motorists believed that the stretch of highway in question was very hilly (Q48), was very curvy (Q47), was scenic (Q46), had a high volume of traffic (Q44), had pavement marking lines that were clear and easy to see (Q45), and made one feel comfortable pulling on to the shoulder if necessary (Q43). As with pavement beliefs, evaluation measures were not gathered for these items.

Analysis

Table 3.1 shows the results of the path analytic multiple regression analyses. Three parallel analyses were conducted, each one using a separate physical pavement measure (PCI, IRI and PATCH). In each case, cognitive structure was first regressed on the various blocks of predictor variables. Then satisfaction was regressed on the same blocks plus cognitive structure. The results will (1) test the relationships illustrated in Figure 3.3 and (2) show how the relationships among physical characteristics of the pavement, cognitive structure, and satisfaction illustrated in Figures 3.2 and 3.3 are affected by the other variables. Hierarchical multiple regression was used, with blocks of variables entered in the following order: **(1)** Demographic control variables — education (Q108), income (from Q109 and 110), sex (Q998b), and age (from Q100); **(2)** the set of experiential variables; **(3)** the set of social variables; **(4)** perceived behavioral control; **(5)** the set of non-pavement beliefs; **(6)** the physical pavement measure; and **(7)** cognitive structure (for the regression of satisfaction only).

Results indicate that the **physical measures $ cognitive structure $ satisfaction** relationships from Figure 3.2 remain in effect, albeit reduced in magnitude, even with controls for these sets of variables. For example, the path from IRI to cognitive structure is .20 (p#.001), from cognitive structure to satisfaction -.61 (p#.001), and from IRI to satisfaction -.08 (p#.05). Similar patterns are found for PCI and square meters of patched pavement per half mile. In each case, cognitive structure significantly reduces (i.e., mediates) the relationship between physical pavement characteristics and satisfaction. Thus, the basic model holds, even with rigorous controls.

Overall, the set of predictor variables account for up to 31% of the variance (see adjusted R^2 in Table 3.1) in cognitive structure and 62% of the variance in satisfaction. To streamline the analysis, forward stepwise regression was performed to maintain R^2 while limiting the number of variables in the analysis. This procedure is essential for the development of a shorter form questionnaire that will retain the variables of greatest impact. The results in **Table 3.2** indicate the variables that should be used in a revised questionnaire in Phase III. In addition to measures of cognitive structure and satisfaction, they are perceived behavioral control, trust in the DOT, subjective norms, education, age, gender, and four non-pavement beliefs — high traffic volume, visible pavement markings, comfortable shoulders and very curvy. (Other variables can be included as well, of course). The best performance is obtained when IRI or PCI are used as the physical pavement measure. In either case, 31% of the variance in cognitive structure and 61% (for IRI) or 62% (for PCI) of the variance in satisfaction is accounted for by the equations. Considerably less variance was accounted for using PATCH. (By comparison, physical measures alone account for up to 4% of the variance in cognitive structure — see R^2 *change* for physical measures.) For this reason, it is important to include psychological measures, such as beliefs and trust to supplement physical pavement measures.

The paths of relationships from the analysis using IRI as the physical pavement measure are illustrated in **Figure 3.4** and can be compared to the hypothesized relationships in Figure 3.3. As noted previously, the path from IRI to cognitive structure to satisfaction remains intact, with cognitive structure being by far the best predictor of satisfaction. Higher IRI ratings seem to produce stronger beliefs about pavement problems on the stretch of highway (beta = .20,

Table 3.1: Relationship of control variables and physical pavement measures to cognitive structure and satisfaction with pavement conditions (full model)

Multiple regression analyses (betas)

Physical Measure Used:	***IRI***		***PCI***		***Patch***	
DEPENDENT VARIABLE:	**Cognitive Structure** **✖ = .89**	**Satis-faction** **✖ = .82**	**Cognitive Structure**	**Satis-faction**	**Cognitive Structure**	**Satis-faction**
DEMOGRAPHIC:						
Education	**-.20****	**.14****	**-.22*****	**.14****	**-.21*****	**.14****
Income	-.04	-.01	-.08	.02	-.04	-.01
Female Sex	-.08	.10	-.09	**.11***	-.08	.10
Age	**- .11***	**.15****	-.10	**.15****	**-.12***	**.16****
R^2 change	**.06*****	**.05****	**.07*****	**.05****	**.06*****	**.05****
EXPERIENTIAL:						
Miles per year driven	-.06	.01	- .05	-.02	-.07	.01
Cycle driving frequency	-.04	-.03	.04	-.03	-.03	-.04
Vehicle "ride"	-.05	.09	-.03	.07	-.04	.09
Frequency of driving stretch	- .07	.09	.05	.06	-.06	.08
R^2 change	.01	.02	.01	.01	.01	.01
SOCIAL:						
Trust in transportation dept. %=.68	**-.11***	**.24*****	**-.15****	**.25*****	**-.12***	**.24*****
Subjective norms	**-.33*****	**.35*****	**-.31*****	**.34*****	**-.32*****	**.33*****
R^2 change	**.14*****	**.22*****	**.14*****	**.23*****	**.14*****	**.21*****
PERCEIVED BEHAVIORAL CONTROL	**-.10***	**.12***	-.09	**.10***	**-.10***	**.12***
R^2 change	**.01***	**.01***	.01	**.01***	**.01***	**.01***
NON-PAVEMENT BELIEFS						
Very hilly	.01	-.03	.01	-.01	-.01	-.02
Very curvy	.09	-.07	**.10***	-.07	.09	-.07
Scenic	**-.03**	.01	-.04	.01	-.03	.02
High traffic volume	**.18*****	-.07	**.17*****	-.06	**.18*****	-.07
Comfortable shoulders	-.09	.09	-.09	**.10***	-.10	**.10***
Clear pavement markings	**-.15****	**.19*****	**-.16****	**.18*****	**-.15****	**.18*****
R^2 change	**.09*****	**.06*****	**.08*****	**.06*****	**.09*****	**.07*****
PHYSICAL MEASURE (see above)	**.20*****	**-.08***	**- .17*****	**-.10***	**.17****	-.05
R^2 change	**.04*****	**.04*****	**.03*****	**.04*****	**.03*****	**.03*****
COGNITIVE STRUCTURE		**-.61*****		**-.62*****		**-.62*****
R^2 change		**.24*****		**.25*****		**.25*****
Multiple R	.59***	.80***	.58***	.80***	.58***	.62***
Adjusted R^2	.31	.61	.30	.62	.30	.38
N	327	327	332	332	320	320

Two-tailed significance key: * p#.05 **p#.01 ***p#.001

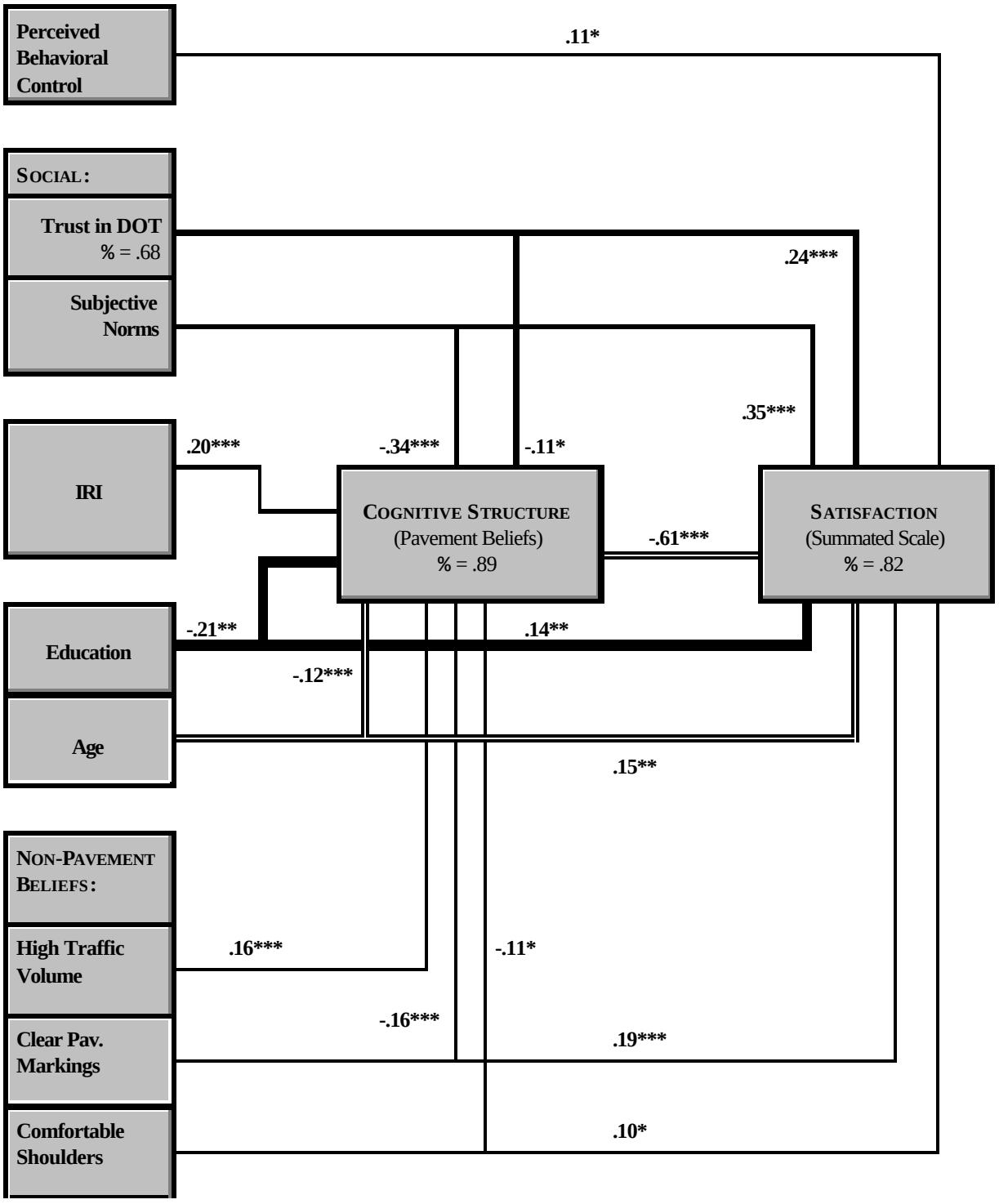
Table 3.2: Relationship of control variables and physical pavement measures to cognitive structure and satisfaction with pavement conditions (focused model)

Multiple regression analyses (betas)

	Physical Measure Used:					
	IRI		***PCI***		***Patch***	
DEPENDENT VARIABLE:	**Cognitive Structure** **%** = .89	**Satis-faction** **%** = .82	**Cognitive Structure**	**Satis-faction**	**Cognitive Structure**	**Satis-faction**
DEMOGRAPHIC:						
Education	**-.21***	**.14****	**-.23*****	**.14****	**-.22*****	**.14****
Age	**-.12*****	**.15****	-.10	**.15****	**-.12***	**.16****
Female Sex	-.07	.10	-.09	**.11***	-.07	.10
R^2 change	**.06*****	**.05****	**.06*****	**.05*****	**.06*****	**.05****
SOCIAL:						
Trust in transportation dept. %=.68	**-.11***	**.24*****	**-.13****	**.25*****	**-.11***	**.25*****
Subjective norms	**-.34*****	**.35*****	**-.32*****	**.34*****	**-.33*****	**.33*****
R^2 change	**.15*****	**.22*****	**.15*****	**.23*****	**.14*****	**.21*****
PERCEIVED BEHAVIORAL CONTROL	-.09	**.11***	-.08	**.10***	-.09	**.11***
R^2 change	.01	**.01***	.01	**.01***	.01	**.01***
NON-PAVEMENT BELIEFS						
Clear pavement markings	**-.16****	**.19*****	**-.15****	**.18*****	**-.15****	**.19*****
High traffic volume	**.16*****	-.06	**.15****	-.06	**.16*****	-.06
Comfortable shoulders	**-.11***	**.10***	**-.10***	**.11***	**-.11***	**.11***
Very curvy	.10	-.08	**.11***	-.08	.10*	-.08
R^2 change	**.09*****	**.07*****	**.08*****	**.06*****	**.09*****	**.07*****
PHYSICAL MEASURE (see above)	**.20*****	**-.07***	**-.18*****	**.09****	**.18*****	-.05
R^2 change	**.04*****	**.04*****	**.03*****	**.03*****	**.03*****	**.02****
COGNITIVE STRUCTURE		**-.61*****		**-.61*****		**-.61*****
R^2 change		**.25*****		**.25*****		**.25*****
Multiple R	.58***	.79***	.57***	.80***	.57***	.79***
Adjusted R^2	.31	.61	.31	.62	.33	.61
N	327	327	332	332	320	320

Figure 3.4: Partial path analysis — Predictors of satisfaction with pavement conditions based on focused model, using IRI

Path Coefficients



Two-tailed significance key: * p # .05 ** p # .01 *** p # .001

p#.001) and, in turn, these beliefs seem to yield less satisfaction with the pavement (beta = -.61, p# .001). Two demographic variables were related to pavement beliefs and satisfaction. Those participants who were younger (beta = -.12, p# .001) and less well educated (beta = -.21, p# .001) held stronger beliefs about pavement problems. Age and education were also related (positively) to pavement satisfaction (beta = .15, p# .01; and beta = .14, p# .01, respectively).

As proposed, perceived behavioral control has a significant (albeit small) relationship with satisfaction such that those who can choose alternate routes are more satisfied with the pavement in the stretch of highway under consideration (beta = .11, p# .05). Similarly, and as proposed, those with higher levels of trust in DOT are more satisfied with the pavement (beta = .24, p#.001), as are those who believe that relevant others feel it is okay for them to drive that stretch of road (subjective norms beta = .35, p#.001). However, both of these social variables also have unexpected, significant relationships with cognitive structure. Specifically, those who have less trust in DOT are a little more likely to believe that the pavement has problems (beta = -.11, p#.05) as do those who believe that relevant others think it is not okay for them to drive that stretch (beta = -.34, p# .001). Thus, these social variables seem to affect what people perceive or believe (cognition, as indicated by cognitive structure) as well as how they feel about it (affect, as indicated by satisfaction).

Among the non-pavement beliefs, those who perceive readily visible pavement markings are indeed more likely to be satisfied with the pavement (beta = .19, p#.001). Also, those who perceive a given stretch of highway to have a comfortable shoulder were a little more likely to be satisfied (beta = .10, p#.05). None of the other pavement beliefs relate directly to satisfaction, as had originally been proposed. Instead, the four non-pavement beliefs that remain in the analysis are all associated with cognitive structure (i.e., pavement beliefs). Specifically, those who perceive readily visible pavement markings are a little less likely to believe that the pavement has problems (beta = -.16, p#.01). On the other hand, those who believe that the stretch of highway has a high volume of traffic are more likely to perceive or believe that the pavement has problems (beta = .16, p#.001). It also seems that those who perceive a given stretch of highway to have a comfortable shoulder are less likely to hold strong beliefs that the pavement is distressed.

In general, the variables seem to behave in a manner consistent with the model.

Microscope

To diagnose the dynamics of the relationships in the **physical measures $ cognitive structure $ satisfaction** chain, we conducted analyses of the relationships among the individual items that comprise the cognitive structure and satisfaction indexes.

Partial correlation coefficients in **Table 3.3** indicate that overall (dis)satisfaction appears to be most affected by beliefs that the pavement causes extra wear on a vehicle's suspension (partial r= -.61, p#.001), produces a bumpy ride (partial r= -.61, p#.001), and that pavement looks patchy (partial r= -.55, p#.001). Beliefs about noisiness and diversion of attention to the road surface play important but somewhat lesser roles. Of some interest is that fact that the visual appearance of the road ("looks patchy") plays such a large role the perception of road quality. Beliefs about a patchy appearance are the best predictor of the attitude that the road is better than most (partial r = -.31, p#.001).

A microscopic analysis of the relationships between physical pavement measurements and pavement beliefs (components of cognitive structure) is shown in **Table 3.4.** IRI is the only one of the three physical pavement measures to bear a statistically significant relationship with each of the five beliefs that comprise cognitive structure. All three physical measures correlate positively with beliefs that the pavement causes extra wear on the car's suspension, produces a bumpy ride, is noisy and looks patchy. IRI correlates with the belief that the pavement draws attention to itself.

In general, however, the relationships between physical pavement characteristics and pavement beliefs are relatively small. Given the fine prediction of satisfaction from belief measures, the problem is probably not in the belief items, which seem comprehensive enough. Instead, it is likely that:

There is some "wasted" variance in the physical measures. In other words, motorists probably can't sense all that the physical measures can.

Some explanatory power might be gained if physical indices are used that include measures that match the appropriate belief measures in analyses such as these. For example, square meters of pavement patched (PATCH) correlates most highly with the belief that the road looks patchy. In Phase III, if possible, physical measures should be matched to the other 4 pavement belief items.

And the most probable explanation:

Many survey respondents had to generalize their perceptions (across time and relatively long sections of highway) in order to give a single response when indicating their beliefs about the stretches of highway they referred to in the interviews. That produces inevitable error (e.g., a leveling or averaging of perceptions) and some misfit between measured pavement characteristics and perceptions. The planned targeted surveys will alleviate that problem, as long as respondents are instructed to drive specific stretches of road in advance of answering questions about it, and should produce stronger relationships between physical pavement data and motorist perceptions

Attitude Toward the Act of Driving

This analysis did not include the Attitude Toward the Act (**AAct**) of driving along the stretch of highway variable included in the questionnaire. AAct was measured by a series of Likert-scaled items measuring whether the respondent considered driving on the stretch as enjoyable (Q61), unpleasant (Q62, reverse coded), a good thing to do (Q63), safe (Q64), undesirable (Q65, reverse coded), convenient (Q66), uncomfortable (Q67, reverse coded), and damaging (Q68, reverse coded). The items sum to form an index of high reliability (Cronbach's alpha=.87). The AAct measure is a broader measure of satisfaction with the driving experience. Initial path analysis indicates that satisfaction predicts to AAct (beta=.47 p#.001) in the series.

Table 3.3: Relationship of pavement beliefs to satisfaction

Partial correlation coefficients [1]

	Satisfaction Measure [2]:			
	Satisfied with pavement (item)	**Should be improved (item)**	**Better than most (item)**	**Satisfaction (summated)** [3] **% = .82**
PAVEMENT BELIEFS [2]				
Driving on the pavement on this section of highway....				
...Causes extra wear on my vehicle's suspension system.	-.58***	.60***	-.30***	-.61***
...Produces a bumpy ride.	-.58***	.61***	-.30***	-.61***
...Causes me to focus my attention on the pavement surface.	-.37***	.43***	-.18***	-.41***
...Is noisy.	-.40***	.43***	-.22***	-.43***
The pavement looks patchy.	-.46***	.55***	-.31***	-.55***
COGNITIVE STRUCTURE (summated pavement beliefs) **% = .89**	-.60***	.67***	-.33***	-.66***
N = 386				

Two-tailed significance key: * p#.05 **p#.01 ***p#.001

1. Seventeenth-order partials controlled by education, income, sex, age, miles driven per year, cycle driving frequency, vehicle "ride," frequency of driving stretch of highway, trust in transportation department, subjective norms, perceived behavioral control, and the set of six non-pavement beliefs. *Not controlled by physical pavement characteristics.*

2. Beliefs and satisfaction items are scaled such that greater agreement produces higher numerical values.

3. Scoring of the item "the pavement...should be improved" was reversed in the calculation of the summated index.

Table 3.4: Relationship of pavement beliefs to physical pavement measures

Partial correlation coefficients [1]

	Physical Pavement Measure:		
	IRI	***PCI***	***Patch***
PAVEMENT BELIEFS [2]			
Driving on the pavement on this section of highway....			
...Causes extra wear on my vehicle's suspension system.	**.19*****	**-.12***	**.20*****
...Produces a bumpy ride.	**.18*****	**-.16****	**.19*****
...Causes me to focus my attention on the pavement surface.	**.11***	-.09	.08
...Is noisy.	**.14****	**-.12***	**.13***
The pavement looks patchy.	**.21*****	**-.15****	**.22*****
COGNITIVE STRUCTURE (summated pavement beliefs) % = .88	**.21*****	**-.16****	**.21*****
N=	327	332	320

Two-tailed significance key: * p#.05 **p#.01 ***p#.001

1. Seventeenth-order partials controlled by education, income, sex, age, miles driven per year, cycle driving frequency, vehicle "ride," frequency of driving stretch of highway, trust in transportation department, subjective norms, perceived behavioral control, and the set of six non-pavement beliefs.

2. Beliefs are scaled such that greater agreement produces higher numerical values.

physical measures $ cognitive structure $ satisfaction $ AAct.

These AAct measures, along with the other variables in the study, will have explanatory value in assessing individuals' affective response to driving on the stretch of pavement and should remain in the questionnaire.

CONCLUSION AND RECOMMENDATIONS FOR PHASE III

The information derived from Phase II about people's perceptions of pavement conditions has proven to be both interesting and valuable. A majority (75%) of Iowa drivers were satisfied with the two-lane rural highways they identified. However, the IRI, PCI and PATCH values which satisfied the majority of the sample were relatively low (in the "good" to "very good" range) for IRI and high (in the "good" to "excellent" range) for PCI. An important question is whether this finding is because drivers have high expectations and are satisfied with only the smoothest, distress free pavements or whether this finding is an anomaly of data set. That is, if a disproportionate number of smooth and distress-free roads were sampled, this would artificially inflate the cutoffs at which a majority of respondents were satisfied with the pavement. In Phase III, the number of highways in each interpretive category will be controlled. It is also noteworthy that motorists seem willing to tolerate some dissatisfaction with pavement quality rather than have to deal with the inconvenience generated by highway repair.

The model performed well and as predicted, especially when it came to the relationship between cognitive structure (pavement beliefs) and satisfaction. In particular, the satisfaction index and its three component measures are extremely useful as diagnostic tools. The size of the coefficients testing the model are generally respectable for the social sciences, especially given the nature of the task — trying to predict something as complex as a person's satisfaction.

The relationship between pavement characteristics and pavement beliefs are, however, relatively weak. It should be noted that these relationships might be stronger if it were not for a methodological limitation. Pavement indices are taken from a very specific section of every mile of the highway. Respondents' perceptions are likely to have been a psychological averaging of pavement conditions over a much greater stretch of highway. With respect to Phase III, the relationships in the entire model should become stronger **(1)** to the extent to which researchers can get respondents to be precise about the stretch of pavement to which they are referring, preferably by arranging for them to drive select stretches of highway in advance of answering questions about it, and **(2)** to the extent to which there are corresponding physical data for that section of highway. Also, the strength of the relationships in the model could have been improved if there had been a direct correspondence between pavement beliefs and pavement distress indices. In Phase III, physical pavement indices should correspond directly with the beliefs to be evaluated, for example, respondents could also be asked whether they believe a given stretch of highway is rough (IRI) and cracked or patched. This will greatly facilitate the investigation of the explanatory power of the notion that a person's beliefs about the pavement are what lead to reported satisfaction.

In general, the Phase III questionnaire should include at least the following, based on the Iowa data:

- The three satisfaction measures (Q57, 58, 59);

- The cognitive structure/pavement belief items (Q32, 34, 36, 38, 40), perhaps augmented as indicated above;

- Non-pavement beliefs about traffic volume (Q44), clear pavement markings (Q45), comfortable shoulders (Q43) and curviness (Q47) — the latter complemented with evaluation scales;

- Perceived behavioral control (Q55);

- The social variables — subjective norms (Q59a) and the four trust items (Q51, 52, 53, 53a);

- The demographic variables of age, sex (Q998b) and education (Q108);

- The measures of Attitude Toward the Act (Q61-68).

Analyses of data from Wisconsin has revealed the need to also include the non-pavement belief about scenery (Q46) and hilliness (Q48) and the experiential variable about motorcycle driving frequency (Q105b).

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APPENDIX 1

Iowa Code Book and Frequencies

```
************************************
project 3175    n of cases  405.0
....................................


deck01


************************************************************************
question 0m          column(s) 6-6

We are talking with a selected group of people about driving on the roads in
your area. You are part of this group. The information will be used to
establish priorities for road maintenance in your area.

Our study works by selecting one adult from your household for a brief
telephone interview.

We scientifically select the person to be interviewed.

Can you tell me how many adults 18 or older live in your household ?

  n      %
-----  ------
   86   21.23           1.  ONE ADULT
  275   67.90           2.  TWO ADULTS
   34    8.40           3.  THREE ADULTS
    9    2.22           4.  FOUR ADULTS
    0    0.00           5.  FIVE ADULTS
    1    0.25           6.  SIX ADULTS
    0    0.00           7.  SEVEN ADULTS
    0    0.00           8.  EIGHT OR MORE ADULTS

************************************************************************

question 0o          column(s) 7-7

How many MEN living there are 18 or older ?

  n      %
-----  ------
   42   10.37           0.  NONE
  328   80.99           1.  ONE
   28    6.91           2.  TWO
    7    1.73           3.  THREE OR MORE

    0    0.00           9.  REFUSED / DK
```

****

question 0p column(s) 8

And how many WOMEN living there are 18 or older ?

n	%		
53	13.09	0.	NONE
331	81.73	1.	ONE
20	4.94	2.	TWO
1	0.25	3.	THREE OR MORE
0	0.00	9.	REFUSED / DK

****

question 1a column(s) 9-9

For this study, we are interested in talking to adults who regularly drive on certain highways. Please think about the roads you drive on regularly, that is, AT LEAST ONCE A WEEK.

Are any of these roads either state or US highways ?

NOTE: IF R IS UNSURE, USE COUNTY MAP TO HELP THEM IDENTIFY THE ROADS THEY NORMALLY DRIVE ON.

IN IOWA, STATE AND US HIGHWAYS ARE NUMBERED, WHILE COUNTY ROADS ARE DESIGNATED BY A LETTER AND NUMBER, SUCH AS "COUNTY ROAD C10"

n	%		
404	99.75	1.	YES
0	0.00	2.	NO
0	0.00	8.	DON'T KNOW
1	0.25	9.	REFUSED

****

question 1c column(s) 10

Do you regularly, that is AT LEAST ONCE A WEEK, drive rural stretches of these highways, that is, sections that lie outside of any city, town, or village boundaries ? Usually, these roads have speed limits of 55 miles per hour.

n	%		
404	99.75	1.	YES
0	0.00	2.	NO
0	0.00	8.	DON'T KNOW
1	0.25	9.	REFUSED

****

question 1d column(s) 11

Are any sections of these rural stretches two-lanes, WITH ONE LANE TRAVELING IN EACH DIRECTION ?

n	%		
404	99.75	1.	YES
0	0.00	2.	NO
0	0.00	8.	DON'T KNOW
1	0.25	9.	REFUSED

****

question 3 column(s) 12

I'm going to read you a series of statements about two- lane rural state highways in Iowa. When I say pavements, I am only referring to the running surface on which vehicles drive. This doesn't include things like shoulders. Please tell me how strongly you agree or disagree with each of the following statements. First...

Rural, two-lane highways in Iowa generally have smooth riding surfaces.

n	%		
64	15.80	1.	STRONGLY AGREE
192	47.41	2.	SOMEWHAT AGREE
41	10.12	3.	FEEL NEUTRAL
74	18.27	4.	SOMEWHAT DISAGREE
33	8.15	5.	STRONGLY DISAGREE
1	0.25	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 4 column(s) 13

The pavements on rural, two-lane highways in Iowa are generally in good condition.

n	%		
89	21.98	1.	STRONGLY AGREE
214	52.84	2.	SOMEWHAT AGREE
37	9.14	3.	FEEL NEUTRAL
49	12.10	4.	SOMEWHAT DISAGREE
15	3.70	5.	STRONGLY DISAGREE
1	0.25	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 5 column(s) 14

Rural, two lane highways in Iowa generally have
pavements that are safe to drive on in normal weather.

NOTE: NORMAL WEATHER CONDITIONS INCLUDE CLEAR CONDITIONS AND RAIN, BUT DON'T INCLUDE SNOW, ICE, UNUSUALLY HEAVY RAINS OR FLOODS, OR OTHER UNUSUAL WEATHER EVENTS.

n	%	
164	40.49	1. STRONGLY AGREE
193	47.65	2. SOMEWHAT AGREE
24	5.93	3. FEEL NEUTRAL
19	4.69	4. SOMEWHAT DISAGREE
5	1.23	5. STRONGLY DISAGREE
0	0.00	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 5a column(s) 15

I find the pavements on rural, two lane highways in Iowa
to be very satisfactory.

n	%	
107	26.42	1. STRONGLY AGREE
193	47.65	2. SOMEWHAT AGREE
33	8.15	3. FEEL NEUTRAL
54	13.33	4. SOMEWHAT DISAGREE
17	4.20	5. STRONGLY DISAGREE
0	0.00	8. DON'T KNOW
1	0.25	9. REFUSED

****

question 20 column(s) 16-18

{20a|1|Let's talk about a different highway, then.}

What two lane rural state or US highway do you drive MOST OFTEN,
that is AT LEAST ONE DAY PER WEEK ?

NOTE: IF R OFFERS MORE THAN ONE HIGHWAY, HAVE THEM SELECT THE ONE THAT THEY DRIVE MOST OFTEN. IF THEY DRIVE MORE THAN ONE EQUALLY OFTEN, HAVE THEM SELECT THE ONE THEY ARE MOST FAMILIAR WITH. IF R DOESN'T KNOW THE HIGHWAY NUMBER, USE COUNTY MAP TO HELP THEM IDENTIFY THE ROAD.

IN WI, STATE AND US HIGHWAYS ARE NUMBERED, WHILE COUNTY ROADS ARE DESIGNATED BY A LETTER OR LETTERS, SUCH AS "COUNTY ROAD PD"

n	%	
2	0.49	000. OTHER
8	1.98	1.
8	1.98	2.
13	3.21	3.
2	0.49	4.
8	1.98	5.
17	4.20	6.
4	0.99	7.
2	0.49	8.
7	1.73	9.
4	0.99	10.
2	0.49	12.
7	1.73	13.
6	1.48	14.
1	0.25	16.
5	1.23	17.
23	5.68	18.
13	3.21	20.
1	0.25	21.
2	0.49	22.
1	0.25	24.
20	4.94	30.
2	0.49	31.
13	3.21	34.
1	0.25	35.
1	0.25	37.
3	0.74	38.
1	0.25	40.
4	0.99	44.
2	0.49	48.
1	0.25	50.
1	0.25	51.
11	2.72	52.
1	0.25	55.

3	0.74	57.	
2	0.49	58.	
8	1.98	59.	
3	0.74	60.	
13	3.21	61.	
15	3.70	63.	
2	0.49	64.	
12	2.96	65.	
5	1.23	67.	
15	3.70	69.	
5	1.23	71.	
7	1.73	75.	
1	0.25	80.	
15	3.70	92.	
1	0.25	93.	
3	0.74	94.	
1	0.25	99.	
2	0.49	103.	
2	0.49	106.	
1	0.25	107.	
2	0.49	130.	
2	0.49	140.	
6	1.48	141.	
1	0.25	144.	
2	0.49	146.	
4	0.99	148.	
3	0.74	149.	
6	1.48	150.	
3	0.74	151.	
6	1.48	163.	
15	3.70	169.	
1	0.25	175.	
1	0.25	183.	
1	0.25	187.	
3	0.74	191.	
1	0.25	210.	
14	3.46	218.	
1	0.25	235.	
7	1.73	275.	
2	0.49	297.	
1	0.25	327.	
1	0.25	330.	
1	0.25	520.	
1	0.25	920.	
2	0.49	927.	
1	0.25	941.	
4	0.99	965.	965
0	0.00	998.	DON'T KNOW/NOT SURE (skip to q 26)
0	0.00	999.	REFUSED (skip to q 26)

****

question 21 column(s) 19-19

What part of highway {20} do you travel most often ? First, what is your starting point, or where do you get on highway {20} ?

(INTERVIEWER: MUST INCLUDE A TOWN NAME.)

n	%		
403	99.51	1.	ANSWERED
0	0.00	8.	DON'TKNOW/NOT SURE
2	0.49	9.	REFUSED
0	0.00	^.	INAP

****

question 21a column(s) 20-20

Next, what is your destination point, or where you get off highway {20} ?

(INTERVIEWER: MUST INCLUDE A TOWN NAME.)

n	%		
404	99.75	1.	ANSWERED
0	0.00	8.	DON'T KNOW/NOT SURE
1	0.25	9.	REFUSED
0	0.00	^.	INAP

****

question 22 column(s) 21

What direction are you traveling on highway {20} when leaving {21}?

NOTE: EVEN NUMBERED HIGHWAYS GENERALLY TRAVEL EAST AND WEST.
ODD NUMBERED HIGHWAYS GENERALLY TRAVEL NORTH AND SOUTH.

n	%		
114	28.15	1.	NORTH
100	24.69	2.	SOUTH
82	20.25	3.	EAST
105	25.93	4.	WEST
4	0.99	8.	DON'T KNOW
0	0.00	9.	REFUSED
0	0.00	^.	Inap

****

question 22a column(s) 22-24

How far do you think it is from {21} to {21a} on highway {20} ?

n	%	
0	0.00	000. LESS THAN 1 TENTH MILE
1	0.25	2.
7	1.73	10.
12	2.96	20.
2	0.49	25.
13	3.21	30.
1	0.25	35.
10	2.47	40.
1	0.25	45.
29	7.16	50.
17	4.20	60.
20	4.94	70.
18	4.44	80.
5	1.23	90.
28	6.91	100.
8	1.98	110.
13	3.21	120.
7	1.73	130.
8	1.98	140.
28	6.91	150.
2	0.49	160.
8	1.98	170.
15	3.70	180.
1	0.25	190.
28	6.91	200.
1	0.25	210.
7	1.73	220.
7	1.73	230.
1	0.25	240.
15	3.70	250.
3	0.74	260.
3	0.74	270.
4	0.99	280.
1	0.25	290.
20	4.94	300.
2	0.49	320.
1	0.25	325.
1	0.25	330.
9	2.22	350.
1	0.25	360.
1	0.25	370.
1	0.25	380.
8	1.98	400.
3	0.74	420.
6	1.48	450.

1	0.25	460.
2	0.49	470.
4	0.99	500.
1	0.25	540.
1	0.25	570.
4	0.99	600.
1	0.25	620.
3	0.74	650.
1	0.25	720.
1	0.25	800.
3	0.74	900.
5	1.23	950. 95 MILES OR MORE
1	0.25	998. DON'T KNOW/NOT SURE
0	0.00	999. REFUSED
0	0.00	^. INAP

****

question 23 column(s) 25

For the purposes of this study, we are interested in focusing on a small section of the roads you normally drive on.

Can you picture the first RURAL mile of highway {20} after leaving {21}? This may be marked by a change in the speed limit, increasing to 55 miles per hour as you are leaving a village or a town.

NOTE: THE BEGINNING OF THE SECTION MAY BE MARKED BY THE END OF CURBING AND SIDEWALKS OF THE VILLAGE OR CITY. IT MAY ALSO BE MARKED BY A NOTICEABLE DIFFERENCE IN THE QUALITY, CONDITION, OR TYPE OF PAVEMENT.

n	%	
401	99.01	1. YES
3	0.74	2. NO (skip to q 24)
1	0.25	8. DON'T KNOW (skip to q 24)
0	0.00	9. REFUSED (skip to q 24)
0	0.00	^. Inap

****

question 23a column(s) 26

Is this section of highway {20} two lanes, that is with one lane traveling in each direction, or more than two lanes ?

n	%	
352	86.91	1. TWO LANES (skip to q 27)
49	12.10	2. MORE THAN TWO LANES
0	0.00	8. DON'T KNOW
0	0.00	9. REFUSED
4	0.99	^. Inap

****

question 23b column(s) 27

Can you picture the first rural mile where highway {20}
turns into two lanes ?

n	%		
45	11.11	1.	YES (skip to q 27)
4	0.99	2.	NO
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED
356	87.90	^.	Inap

****

question 24 column(s) 28

How about the last RURAL mile of highway {20} just before {21a} ?

Can you picture this section of highway {20} ?

NOTE: THE END OF THE SECTION MAY BE MARKED BY THE BEGINNING OF CURBING
AND SIDEWALKS OF THE VILLAGE OR CITY. IT MAY ALSO BE MARKED BY A
NOTICEABLE DIFFERENCE IN THE QUALITY, CONDITION, OR TYPE OF PAVEMENT.

n	%		
7	1.73	1.	YES
1	0.25	2.	NO (skip to q 25)
0	0.00	8.	DON'T KNOW (skip to q 25)
0	0.00	9.	REFUSED (skip to q 25)
397	98.02	^.	Inap

****

question 24a column(s) 29

Is this section of highway {20} two lanes, that is with one
lane traveling in each direction, or more than two lanes ?

n	%		
7	1.73	1.	TWO LANES (skip to q 27)
0	0.00	2.	MORE THAN TWO LANES
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED
398	98.27	^.	Inap

****

question 25 column(s) 30

Could you picture any one mile section of road that is two lanes on highway {20} driving from {21} towards {21a} ?

NOTE: IT WOULD TAKE ABOUT A MINUTE TO DRIVE ONE MILE AT 55 MPH.

n	%		
1	0.25	1.	YES (skip to q 27)
0	0.00	2.	NO
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED
404	99.75	^.	Inap

****

question 26 column(s) 31

For this study, it is very important for you to focus on a 1-3 mile section of a rural, two lane highway. Are there ANY highways that you regularly drive where you would be able to identify a specific section ?

NOTE: IT WOULD TAKE ABOUT A MINUTE TO DRIVE ONE MILE AT 55 MPH.
(REGULARLY = AT LEAST ONCE A WEEK.)

n	%		
0	0.00	1.	YES (skip to q 20)
0	0.00	2.	NO
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED
405	100.00	^.	Inap

****

question 27 column(s) 32-32

Can you tell me about any landmarks at the beginning of this section ?

NOTE: ASK FOR AND RECORD ANY LANDMARKS SUCH AS BUSINESSES, CHURCHES, CEMETERIES, TAVERNS, INTERSECTIONS, ETC.

n	%		
367	90.62	1.	ANSWERED
30	7.41	2.	NO LANDMARK
8	1.98	8.	DON'T KNOW/NOT SURE
0	0.00	9.	REFUSED
0	0.00	^.	INAP

****

question 28 column(s) 33-33

And can you tell me about any landmarks at the end of this section ?

NOTE: ASK FOR AND RECORD ANY LANDMARKS SUCH AS BUSINESSES, CHURCHES, CEMETERIES, TAVERNS, INTERSECTIONS, ETC.

n	%		
319	78.77	1.	ANSWERED
65	16.05	2.	NO LANDMARK
21	5.19	8.	DON'T KNOW/NOT SURE
0	0.00	9.	REFUSED
0	0.00	^.	INAP

****

question 28a column(s) 34

How many days per week do you drive on highway {20} ?

n	%		
0	0.00	1.	LESS THAN ONCE PER WEEK (skip to q 20)
84	20.74	2.	ONE
114	28.15	3.	TWO OR THREE
97	23.95	4.	FOUR OR FIVE
110	27.16	5.	SIX OR SEVEN
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED
0	0.00	^.	Inap

****

question 32 column(s) 35

Now, I'm going to read some statements that people might make about the pavement on rural highways. Thinking about driving this short one-mile-long section of highway {20}, please tell me whether you agree or disagree with each statement. Remember, we are only talking about the pavement right now. First...

Driving on the PAVEMENT on this section of highway {20} causes extra wear on my vehicle's suspension system ?

(Would you strongly agree, somewhat agree, feel neutral, somewhat disagree, or strongly disagree ?)

n	%		
44	10.86	1.	STRONGLY AGREE
51	12.59	2.	SOMEWHAT AGREE
43	10.62	3.	FEEL NEUTRAL
85	20.99	4.	SOMEWHAT DISAGREE
177	43.70	5.	STRONGLY DISAGREE
5	1.23	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 34 column(s) 36

Driving on the PAVEMENT on this section of highway {20} produces a bumpy ride ?

n	%		
51	12.59	1.	STRONGLY AGREE
66	16.30	2.	SOMEWHAT AGREE
26	6.42	3.	FEEL NEUTRAL
91	22.47	4.	SOMEWHAT DISAGREE
170	41.98	5.	STRONGLY DISAGREE
0	0.00	8.	DON'T KNOW
1	0.25	9.	REFUSED

****

question 36 column(s) 37

Driving on the PAVEMENT on this section of highway {20} causes me to focus my attention on the pavement surface ?

(INTV'R:THIS MIGHT INCLUDE THINGS LIKE TURNING DOWN THE RADIO OR STOPPING CONVERSATIONS)

n	%	
63	15.56	1. STRONGLY AGREE
70	17.28	2. SOMEWHAT AGREE
51	12.59	3. FEEL NEUTRAL
86	21.23	4. SOMEWHAT DISAGREE
134	33.09	5. STRONGLY DISAGREE
0	0.00	8. DON'T KNOW
1	0.25	9. REFUSED

****

question 38 column(s) 38

Driving on the PAVEMENT on this section of highway {20} is noisy ?

NOTE: THIS WOULD INCLUDE NOISE CAUSED BY GROOVES RUNNING ACROSS THE PAVEMENT TO IMPROVE TRACTION, WHICH CAN MAKE A HIGH PITCHED WHINING SOUND. WE ARE NOT TALKING ABOUT RUMBLE STRIPS OR BARS.

n	%	
43	10.62	1. STRONGLY AGREE
45	11.11	2. SOMEWHAT AGREE
43	10.62	3. FEEL NEUTRAL
105	25.93	4. SOMEWHAT DISAGREE
169	41.73	5. STRONGLY DISAGREE
0	0.00	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 40 column(s) 39

The pavement on this section of highway {20} looks "patchy".

n	%	
65	16.05	1. STRONGLY AGREE
63	15.56	2. SOMEWHAT AGREE
30	7.41	3. FEEL NEUTRAL
92	22.72	4. SOMEWHAT DISAGREE
150	37.04	5. STRONGLY DISAGREE
5	1.23	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 43 column(s) 40

Now I would like to read some statements about other, NON- PAVEMENT characteristics of this one mile section of highway {20}.
Again, for each statement, please tell me whether you strongly agree, somewhat agree, feel neutral, somewhat disagree, or strongly disagree.
First...

I would feel comfortable pulling on to the shoulder on this section of highway {20} if I had to.

n	%		
175	43.21	1.	STRONGLY AGREE
107	26.42	2.	SOMEWHAT AGREE
22	5.43	3.	FEEL NEUTRAL
28	6.91	4.	SOMEWHAT DISAGREE
72	17.78	5.	STRONGLY DISAGREE
1	0.25	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 44 column(s) 41

There is a lot of traffic on this section of highway {20}.

n	%		
233	57.53	1.	STRONGLY AGREE
97	23.95	2.	SOMEWHAT AGREE
33	8.15	3.	FEEL NEUTRAL
33	8.15	4.	SOMEWHAT DISAGREE
8	1.98	5.	STRONGLY DISAGREE
1	0.25	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 45 column(s) 42

The lines on this section of highway {20} are clear and easy to see.

n	%		
195	48.15	1.	STRONGLY AGREE
114	28.15	2.	SOMEWHAT AGREE
25	6.17	3.	FEEL NEUTRAL
39	9.63	4.	SOMEWHAT DISAGREE
31	7.65	5.	STRONGLY DISAGREE
1	0.25	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 46 column(s) 43

The scenery on this section of highway {20} is attractive.

n	%		
106	26.17	1.	STRONGLY AGREE
122	30.12	2.	SOMEWHAT AGREE
98	24.20	3.	FEEL NEUTRAL
45	11.11	4.	SOMEWHAT DISAGREE
33	8.15	5.	STRONGLY DISAGREE
1	0.25	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 47 column(s) 44

This section of highway {20} is very curvy.

n	%		
64	15.80	1.	STRONGLY AGREE
57	14.07	2.	SOMEWHAT AGREE
11	2.72	3.	FEEL NEUTRAL
51	12.59	4.	SOMEWHAT DISAGREE
221	54.57	5.	STRONGLY DISAGREE
1	0.25	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 48 column(s) 45

This section of highway {20} is very hilly.

n	%		
70	17.28	1.	STRONGLY AGREE
73	18.02	2.	SOMEWHAT AGREE
26	6.42	3.	FEEL NEUTRAL
67	16.54	4.	SOMEWHAT DISAGREE
169	41.73	5.	STRONGLY DISAGREE
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 51 column(s) 46

Now, I would like to read you some general statements about the DOT, driving, and highway {20}. Please tell me how much you agree or disagree with each one. First...

The state DOT is CAPABLE of doing a good job of fixing and replacing pavements on rural highways in Iowa.

n	%		
121	29.88	1.	STRONGLY AGREE
192	47.41	2.	SOMEWHAT AGREE
50	12.35	3.	FEEL NEUTRAL
26	6.42	4.	SOMEWHAT DISAGREE
14	3.46	5.	STRONGLY DISAGREE
2	0.49	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 52 column(s) 47

I trust the JUDGEMENT of the state DOT when it comes to scheduling pavement improvements.

n	%		
85	20.99	1.	STRONGLY AGREE
173	42.72	2.	SOMEWHAT AGREE
56	13.83	3.	FEEL NEUTRAL
51	12.59	4.	SOMEWHAT DISAGREE
35	8.64	5.	STRONGLY DISAGREE
5	1.23	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 53 column(s) 48

State DOT officials care about the safety and convenience of drivers on this stretch of road.

n	%		
163	40.25	1.	STRONGLY AGREE
151	37.28	2.	SOMEWHAT AGREE
50	12.35	3.	FEEL NEUTRAL
19	4.69	4.	SOMEWHAT DISAGREE
15	3.70	5.	STRONGLY DISAGREE
7	1.73	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 53a column(s) 49

The DOT considers input from people like me when making decisions about repairs
or improvements to this stretch of highway {20}.

n	%	
51	12.59	1. STRONGLY AGREE
103	25.43	2. SOMEWHAT AGREE
120	29.63	3. FEEL NEUTRAL
59	14.57	4. SOMEWHAT DISAGREE
40	9.88	5. STRONGLY DISAGREE
31	7.65	8. DON'T KNOW
1	0.25	9. REFUSED

****

question 55 column(s) 50

If I wanted to, I could easily find a convenient alternate route to the places I usually go instead of using this stretch of highway {20}.

n	%	
98	24.20	1. STRONGLY AGREE
95	23.46	2. SOMEWHAT AGREE
18	4.44	3. FEEL NEUTRAL
53	13.09	4. SOMEWHAT DISAGREE
141	34.81	5. STRONGLY DISAGREE
0	0.00	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 56 column(s) 51

Most of the trips I take on this stretch of highway {20} are trips that I have to take.

n	%	
284	70.12	1. STRONGLY AGREE
59	14.57	2. SOMEWHAT AGREE
13	3.21	3. FEEL NEUTRAL
30	7.41	4. SOMEWHAT DISAGREE
18	4.44	5. STRONGLY DISAGREE
1	0.25	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 57 column(s) 52

I am satisfied with the pavement on this section of highway {20}.

n	%	
165	40.74	1. STRONGLY AGREE
136	33.58	2. SOMEWHAT AGREE
19	4.69	3. FEEL NEUTRAL
43	10.62	4. SOMEWHAT DISAGREE
42	10.37	5. STRONGLY DISAGREE
0	0.00	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 58 column(s) 53

The pavement on this stretch of highway {20} should be improved.

n	%	
88	21.73	1. STRONGLY AGREE
77	19.01	2. SOMEWHAT AGREE
49	12.10	3. FEEL NEUTRAL
97	23.95	4. SOMEWHAT DISAGREE
92	22.72	5. STRONGLY DISAGREE
2	0.49	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 59 column(s) 54

The pavement on this stretch of highway {20} is
better than most of the stretches of state highways I've driven
recently in Iowa.

n	%	
109	26.91	1. STRONGLY AGREE
112	27.65	2. SOMEWHAT AGREE
89	21.98	3. FEEL NEUTRAL
47	11.60	4. SOMEWHAT DISAGREE
42	10.37	5. STRONGLY DISAGREE
6	1.48	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 59a column(s) 55

Most people whose opinions are important to me think that it is OK for me to drive this stretch of highway {20}.

n	%		
209	51.60	1.	STRONGLY AGREE
131	32.35	2.	SOMEWHAT AGREE
38	9.38	3.	FEEL NEUTRAL
6	1.48	4.	SOMEWHAT DISAGREE
12	2.96	5.	STRONGLY DISAGREE
9	2.22	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 61 column(s) 56

Enjoyable.

n	%		
91	22.47	1.	STRONGLY AGREE
151	37.28	2.	SOMEWHAT AGREE
105	25.93	3.	FEEL NEUTRAL
29	7.16	4.	SOMEWHAT DISAGREE
29	7.16	5.	STRONGLY DISAGREE
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 62 column(s) 57

Unpleasant.

n	%		
23	5.68	1.	STRONGLY AGREE
34	8.40	2.	SOMEWHAT AGREE
36	8.89	3.	FEEL NEUTRAL
113	27.90	4.	SOMEWHAT DISAGREE
199	49.14	5.	STRONGLY DISAGREE
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED

```
************************************
project 3175    n of cases  405.0
....................................

deck02

************************************************************************

question 63           column(s) 6

A good thing to do.

  n      %
-----  ------
  127   31.36           1.  STRONGLY AGREE
  140   34.57           2.  SOMEWHAT AGREE
   88   21.73           3.  FEEL NEUTRAL
   25    6.17           4.  SOMEWHAT DISAGREE
   18    4.44           5.  STRONGLY DISAGREE
    7    1.73           8.  DON'T KNOW
    0    0.00           9.  REFUSED

************************************************************************
question 64           column(s) 7

Safe.

  n      %
-----  ------
  176   43.46           1.  STRONGLY AGREE
  138   34.07           2.  SOMEWHAT AGREE
   41   10.12           3.  FEEL NEUTRAL
   27    6.67           4.  SOMEWHAT DISAGREE
   22    5.43           5.  STRONGLY DISAGREE
    1    0.25           8.  DON'T KNOW
    0    0.00           9.  REFUSED

************************************************************************
question 65           column(s) 8

Undesirable.

  n      %
-----  ------
   18    4.44           1.  STRONGLY AGREE
   34    8.40           2.  SOMEWHAT AGREE
   35    8.64           3.  FEEL NEUTRAL
  110   27.16           4.  SOMEWHAT DISAGREE
  208   51.36           5.  STRONGLY DISAGREE
    0    0.00           8.  DON'T KNOW
    0    0.00           9.  REFUSED
```

```
**********************************************************************
question 66           column(s) 9

Convenient.

  n      %
-----  ------
  264   65.19           1.  STRONGLY AGREE
  117   28.89           2.  SOMEWHAT AGREE
   11    2.72           3.  FEEL NEUTRAL
    5    1.23           4.  SOMEWHAT DISAGREE
    7    1.73           5.  STRONGLY DISAGREE
    1    0.25           8.  DON'T KNOW
    0    0.00           9.  REFUSED

**********************************************************************
question 67           column(s) 10

Uncomfortable.

  n      %
-----  ------
   30    7.41           1.  STRONGLY AGREE
   51   12.59           2.  SOMEWHAT AGREE
   37    9.14           3.  FEEL NEUTRAL
   92   22.72           4.  SOMEWHAT DISAGREE
  195   48.15           5.  STRONGLY DISAGREE
    0    0.00           8.  DON'T KNOW
    0    0.00           9.  REFUSED

**********************************************************************
question 68           column(s) 11

Damaging.

  n      %
-----  ------
   21    5.19           1.  STRONGLY AGREE
   42   10.37           2.  SOMEWHAT AGREE
   34    8.40           3.  FEEL NEUTRAL
   88   21.73           4.  SOMEWHAT DISAGREE
  219   54.07           5.  STRONGLY DISAGREE
    1    0.25           8.  DON'T KNOW
    0    0.00           9.  REFUSED
```

****

question 69 column(s) 12

I'd like to thank you again for your patience. We are nearing the end of the interview.

The DOT has limited resources and increasing demands to fill. I would like to ask you a few questions about how you think the DOT should use its resources to best meet the needs of residents in the state.

Do you think it is possible to build pavements in Iowa
that would initially cost more to build but last longer while maintaining a good riding surface ?

n	%		
326	80.49	1.	YES
29	7.16	2.	NO (skip to q 73)
50	12.35	8.	DON'T KNOW (skip to q 73)
0	0.00	9.	REFUSED (skip to q 73)

****

question 70 column(s) 13

Do you think that pavements in Iowa SHOULD be built to last longer ?

n	%		
317	78.27	1.	YES
5	1.23	2.	NO (skip to q 73)
3	0.74	3.	DEPENDS (VOL)
1	0.25	8.	DON'T KNOW (skip to q 73)
0	0.00	9.	REFUSED (skip to q 73)
79	19.51	^.	Inap

****

question 71 column(s) 14

If you knew it would cost more to build pavements to last longer, would you still want pavements in Iowa to be built to last longer ?

n	%		
301	74.32	1.	YES
7	1.73	2.	NO (skip to q 73)
8	1.98	3.	DEPENDS (VOL)
4	0.99	8.	DON'T KNOW (skip to q 73)
0	0.00	9.	REFUSED (skip to q 73)
85	20.99	^.	Inap

****

question 72 column(s) 15

Do you think the cost of building longer-lasting pavements should be paid for by 1) raising more funds, or by 2) delaying some repairs on other pavements and tolerating a poorer ride on those pavements until funds are available ?

n	%		
227	56.05	1.	RAISE MORE FUNDS
66	16.30	2.	DELAY CONSTRUCTION
15	3.70	8.	DON'T KNOW
1	0.25	9.	REFUSED
96	23.70	^.	Inap

****

question 73 column(s) 16

The Department of Transportation can use different strategies to improve the state's highway system. Which would you prefer ? 1.) Providing an equally smooth ride on all highways, or 2.) providing a better ride on more heavily traveled highways, while accepting a bumpier ride on less traveled ones.

n	%		
199	49.14	1.	EQUAL RIDE ON ALL HIGHWAYS
200	49.38	2.	BETTER RIDE ON HEAVILY TRAVELED/BUMPIER RIDE ON LONELY HIGHWAYS
4	0.99	8.	DON'T KNOW
2	0.49	9.	REFUSED

****

question 74 column(s) 17-17

Pavements begin to wear as soon as they are built. Assuming costs were the same, would you prefer to resurface pavements every 10 or 12 years and put up with frequent short construction delays, OR resurface every 18 to 20 years, REALIZING that pavements may be in poorer condition toward the end of that period ?

n	%		
327	80.74	1.	10 TO 12 YEARS
70	17.28	2.	18 TO 20 YEARS
1	0.25	3.	OTHER, specify: __
7	1.73	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 75 column(s) 18

If you had to make repairs on a 30 mile stretch of highway you regularly drive, would you choose: 1) To repair 10 miles for each of the next three years, and tolerate shorter delays for each of those three years, or would you choose 2) To repair all 30 miles of highway in one year, recognizing you may have to tolerate one, longer period of delays ?

n	%	
160	39.51	1. 10 MILES/THREE YEARS
240	59.26	2. 30 MILES/ONE YEAR
5	1.23	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 76 column(s) 19

Would you design a construction project that caused a 30 minute DETOUR for drivers but only lasted 2 months, or would you construct it so that it only caused drivers a 10 minute delay and no detour, but lasted 5 or 6 months ?

n	%	
156	38.52	1. 30 MINUTE DETOUR, 2 MONTHS
242	59.75	2. 10 MINUTE DELAY, 5-6 MONTHS
6	1.48	8. DON'T KNOW
1	0.25	9. REFUSED

****

question 77 column(s) 20-22

If it normally took you 12 minutes to travel a 10 mile stretch of road, what would you consider a reasonable amount of time to travel the same 10 miles while under reconstruction ?

n	%	
1	0.25	000. LESS THAN ONE MINUTE
1	0.25	2.
1	0.25	5.
1	0.25	6.
1	0.25	8.
1	0.25	10.
3	0.74	12.
1	0.25	14.
36	8.89	15.
4	0.99	16.
12	2.96	17.

21	5.19	18.	
161	39.75	20.	
2	0.49	21.	
8	1.98	22.	
2	0.49	23.	
56	13.83	24.	
33	8.15	25.	
1	0.25	29.	
43	10.62	30.	
2	0.49	35.	
1	0.25	40.	
2	0.49	45.	
1	0.25	60.	
0	0.00	600.	600 MINUTES
10	2.47	998.	DON'T KNOW/NOT SURE
0	0.00	999.	REFUSED

****

question 78 column(s) 23-25

And what would you consider an unacceptably long time to get through the same 10 mile work zone ?

n	%		
1	0.25	000.	LESS THAN ONE MINUTE
1	0.25	13.	
9	2.22	15.	
2	0.49	19.	
32	7.90	20.	
9	2.22	21.	
4	0.99	24.	
34	8.40	25.	
1	0.25	26.	
1	0.25	27.	
142	35.06	30.	
1	0.25	31.	
1	0.25	32.	
17	4.20	35.	
5	1.23	36.	
2	0.49	37.	
27	6.67	40.	
1	0.25	42.	
49	12.10	45.	
1	0.25	48.	
1	0.25	50.	
1	0.25	55.	
49	12.10	60.	
3	0.74	90.	
2	0.49	120.	
0	0.00	600.	600 MINUTES
9	2.22	998.	DON'T KNOW/NOT SURE
0	0.00	999.	REFUSED

****

question 79 column(s) 26-27

If 10 miles of rural two lane highway are being reconstructed, and the normal speed limit is 55 MPH, what would you consider a reasonable speed limit through the 10 mile work zone ?

n	%	
0	0.00	00. LESS THAN 1 MPH
2	0.49	5.
3	0.74	10.
2	0.49	15.
13	3.21	20.
39	9.63	25.
50	12.35	30.
1	0.25	32.
109	26.91	35.
2	0.49	37.
99	24.44	40.
60	14.81	45.
10	2.47	50.
7	1.73	55. 55MPH
7	1.73	98. DON'T KNOW/NOT SURE
1	0.25	99. REFUSED

****

question 80 column(s) 28-29

What speed would you consider unacceptably slow through the 10 mile work zone ?

n	%	
4	0.99	00. LESS THAN 1 MPH
1	0.25	2.
18	4.44	5.
58	14.32	10.
65	16.05	15.
65	16.05	20.
1	0.25	22.
80	19.75	25.
5	1.23	29.
48	11.85	30.
2	0.49	34.
35	8.64	35.
1	0.25	39.
8	1.98	40.
1	0.25	44.
4	0.99	45.
0	0.00	55. 55MPH
8	1.98	98. DON'T KNOW/NOT SURE
1	0.25	99. REFUSED

****

question 81 column(s) 30

If you only had a limited amount of money to spend on pavement repairs for a stretch of highway, and you had to choose between these five things, and you could pick ONLY ONE, which would you choose: 1) fixing a bumpy highway, 2) correcting a noisy pavement, 3) resurfacing a patched pavement, 4) building a longer lasting pavement, or 5) reducing construction delays ?

n	%		
111	27.41	1.	FIX BUMPY HIGHWAY
7	1.73	2.	CORRECT NOISY PAVEMENT
41	10.12	3.	RESURFACE PATCHED PAVEMENT
217	53.58	4.	BUILD LONGER LASTING PAVEMENT
25	6.17	5.	REDUCE CONSTRUCTION DELAY
3	0.74	8.	DON'T KNOW
1	0.25	9.	REFUSED

****

question 81k column(s) 31

If you had additional money to spend on this section, what would you choose next ?

n	%		
115	28.40	1.	FIX BUMPY HIGHWAY
12	2.96	2.	CORRECT NOISY PAVEMENT
122	30.12	3.	RESURFACE PATCHED PAVEMENT
75	18.52	4.	BUILD LONGER LASTING PAVEMENT
75	18.52	5.	REDUCE CONSTRUCTION DELAY
1	0.25	8.	DON'T KNOW
1	0.25	9.	REFUSED
4	0.99	^.	Inap

****

question 81m column(s) 32

If you had additional money to spend on this section, what would you choose next ?

n	%		
92	22.72	1.	FIX BUMPY HIGHWAY
28	6.91	2.	CORRECT NOISY PAVEMENT
118	29.14	3.	RESURFACE PATCHED PAVEMENT
58	14.32	4.	BUILD LONGER LASTING PAVEMENT
101	24.94	5.	REDUCE CONSTRUCTION DELAY
1	0.25	8.	DON'T KNOW
1	0.25	9.	REFUSED
6	1.48	^.	Inap

****

question 81n column(s) 33

If you had additional money to spend on this section, what would you choose next ?

n	%	
74	18.27	1. FIX BUMPY HIGHWAY
67	16.54	2. CORRECT NOISY PAVEMENT
79	19.51	3. RESURFACE PATCHED PAVEMENT
39	9.63	4. BUILD LONGER LASTING PAVEMENT
137	33.83	5. REDUCE CONSTRUCTION DELAY
0	0.00	8. DON'T KNOW
1	0.25	9. REFUSED
8	1.98	^. Inap

****

question 100 column(s) 34-35

The next few questions ask for a little more information about yourself.

First, in what year were you born ?

n	%	
0	0.00	00. 1900
1	0.25	10.
1	0.25	11.
1	0.25	13.
1	0.25	14.
1	0.25	15.
1	0.25	17.
1	0.25	18.
1	0.25	19.
2	0.49	20.
2	0.49	21.
1	0.25	22.
3	0.74	23.
3	0.74	24.
3	0.74	25.
7	1.73	26.
2	0.49	27.
5	1.23	28.
4	0.99	29.
7	1.73	30.
4	0.99	31.
3	0.74	32.
5	1.23	33.
3	0.74	34.
4	0.99	35.
6	1.48	36.
6	1.48	37.

3	0.74	38.
9	2.22	39.
6	1.48	40.
7	1.73	41.
4	0.99	42.
7	1.73	43.
10	2.47	44.
5	1.23	45.
7	1.73	46.
8	1.98	47.
9	2.22	48.
5	1.23	49.
9	2.22	50.
6	1.48	51.
6	1.48	52.
15	3.70	53.
10	2.47	54.
16	3.95	55.
9	2.22	56.
7	1.73	57.
15	3.70	58.
7	1.73	59.
14	3.46	60.
7	1.73	61.
6	1.48	62.
13	3.21	63.
10	2.47	64.
7	1.73	65.
3	0.74	66.
11	2.72	67.
9	2.22	68.
6	1.48	69.
11	2.72	70.
6	1.48	71.
7	1.73	72.
8	1.98	73.
2	0.49	74.
5	1.23	75.
4	0.99	76.
5	1.23	77.
7	1.73	78.
4	0.99	79. 1979
1	0.25	98. DON'T KNOW/NOT SURE
1	0.25	99. REFUSED

****
question 101 column(s) 36-36

What kind of vehicle do you normally drive ? Do you normally drive a car, minivan, van, pickup truck, sports utility vehicle, or some other vehicle ?

NOTE: IF R DRIVES MORE THAN ONE VEHICLE, THEY SHOULD ANSWER FOR THE VEHICLE DRIVEN MOST FREQUENTLY

A MINIVAN SEATS 7 OR LESS PEOPLE
A VAN SEATS 8 OR MORE PEOPLE

n	%		
221	54.57	1.	CAR
42	10.37	2.	MINIVAN OR VAN (skip to q 103)
105	25.93	3.	PICKUP TRUCK (skip to q 103)
31	7.65	4.	SPORTS UTILITY VEHICLE (skip to q 103)
6	1.48	5.	OTHER VEHICLE, specify:__ (skip to q 103)
0	0.00	8.	DON'T KNOW (skip to q 103)
0	0.00	9.	REFUSED (skip to q 103)

****
question 102 column(s) 37

Would you consider your car a compact, mid-size, or full-size car ?

n	%		
39	9.63	1.	COMPACT
109	26.91	2.	MID SIZE
72	17.78	3.	FULL SIZE
0	0.00	8.	DON'T KNOW
1	0.25	9.	REFUSED
184	45.43	^.	Inap

****
question 103 column(s) 38

And how would you rate the quality of the ride of your vehicle ? Would you say it has a very good, good, average, poor, or very poor ride ?

n	%		
145	35.80	1.	VERY GOOD
151	37.28	2.	GOOD
93	22.96	3.	AVERAGE
14	3.46	4.	POOR
2	0.49	5.	VERY POOR
0	0.00	8.	DON'T KNOW
0	0.00	9.	REFUSED

****

question 104 column(s) 39-41

About how many miles do you drive annually ?

NOTE: PLEASE DO NOT ACCEPT A RANGE.

n	%	
3	0.74	000. LESS THAN 100 MILES
1	0.25	3.
3	0.74	10.
1	0.25	12.
3	0.74	15.
1	0.25	20.
4	0.99	25.
1	0.25	28.
7	1.73	30.
1	0.25	35.
2	0.49	36.
5	1.23	40.
11	2.72	50.
6	1.48	60.
3	0.74	70.
1	0.25	75.
6	1.48	80.
1	0.25	90.
41	10.12	100.
1	0.25	104.
3	0.74	110.
37	9.14	120.
4	0.99	130.
6	1.48	140.
60	14.81	150.
6	1.48	160.
3	0.74	170.
12	2.96	180.
50	12.35	200.
2	0.49	220.
1	0.25	230.
26	6.42	250.
2	0.49	270.
26	6.42	300.
11	2.72	350.
3	0.74	360.
1	0.25	380.
9	2.22	400.
1	0.25	450.
1	0.25	480.
6	1.48	500.
1	0.25	530.
1	0.25	550.
1	0.25	630.

1	0.25	650.
1	0.25	700.
1	0.25	750.
3	0.74	800.
11	2.72	900. 90,000 MILES
13	3.21	998. DON'T KNOW/NOT SURE
0	0.00	999. REFUSED

****

question 105 column(s) 42

Do you have a CDL or Commercial Driver's License ?

n	%	
75	18.52	1. YES
329	81.23	2. NO
1	0.25	8. DON'T KNOW
0	0.00	9. REFUSED

****

question 105a column(s) 43

Do you have a motorcycle license ?

n	%	
66	16.30	1. YES
339	83.70	2. NO (skip to q 106)
0	0.00	8. DON'T KNOW (skip to q 106)
0	0.00	9. REFUSED (skip to q 106)

****

question 105b column(s) 44-46

How often did you ride a motorcycle in the last year ?

n	%	
28	6.91	000. DIDN'T RIDE IN THE PAST YEAR
3	0.74	101. 1 TIME PER YEAR
4	0.99	102.
3	0.74	103.
1	0.25	105.
1	0.25	109.
2	0.49	110.
2	0.49	112.
3	0.74	120.
1	0.25	125.
0	0.00	199. 99 TIMES PER YEAR
1	0.25	201. 1 TIME PER MONTH
2	0.49	202.
0	0.00	299. 99 TIMES PER MONTH

```
    1    0.25           301.  1 TIME PER WEEK
    2    0.49             302.
    3    0.74             303.
    2    0.49             304.
    1    0.25             307.
    0    0.00           399.  99 TIMES PER WEEK
    1    0.25           401.  1 TIME PER DAY
    0    0.00           499.  99 TIMES PER DAY
    3    0.74           998.  DON'T KNOW/NOT SURE
    2    0.49           999.  REFUSED
  339   83.70           ^.  INAP

*********************************************************************
question 106           column(s) 47

Are you of Hispanic origin, such as Mexican American, Latin American, Puerto
Rican, or Cuban ?

  n      %
-----  ------
    4    0.99           1.  YES ( skip to q 108  )
  400   98.77           2.  NO
    0    0.00           8.  DON'T KNOW
    1    0.25           9.  REFUSED

*********************************************************************
question 107           column(s) 48-48

What is your ethnic origin or race ?  Would you say black or African-
American, Asian or Pacific Islander, American Indian, white, or
something else ?

  n      %
-----  ------
    3    0.74           1.  BLACK OR AFRICAN  AMERICAN
    1    0.25           2.  ASIAN OR PACIFIC ISLANDER
    2    0.49           3.  AMERICAN INDIAN
  389   96.05           4.  WHITE
    2    0.49           5.  OTHER, specify:__
    0    0.00           8.  DON'T KNOW
    4    0.99           9.  REFUSED
    4    0.99           ^.  Inap
```

****

question 108 column(s) 49-50

What is the highest grade or year of school you completed ?

n	%		
7	1.73	01.	EIGHTH GRADE OR LESS
20	4.94	02.	SOME HIGH SCHOOL
165	40.74	03.	HIGH SCHOOL GRAD OR GED CERTIFICATE
18	4.44	04.	SOME TECHNICAL SCHOOL OR VOCATIONAL TRAINING
7	1.73	05.	TECHNICAL SCHOOL GRADUATE
97	23.95	06.	SOME COLLEGE OR ASSOCIATE DEGREE
62	15.31	07.	COLLEGE GRADUATE
29	7.16	08.	POST GRAD OR PROFESSIONAL DEGREE
0	0.00	00.	OTHER, specify:_____
0	0.00	98.	DON'T KNOW/NOT SURE
0	0.00	99.	REFUSED

****

question 109 column(s) 51-53

And, just roughly, what was your total household income last year,
from all sources, BEFORE TAXES ?

n	%		
0	0.00	000.	LESS THAN $1,000 (skip to q 111)
0	0.00	001.	$1,000 TO $1,999
3	0.74	5.	
3	0.74	7.	
2	0.49	8.	
4	0.99	010.	$10,000 TO $10,999
1	0.25	11.	
5	1.23	12.	
3	0.74	13.	
2	0.49	14.	
16	3.95	15.	
3	0.74	16.	
1	0.25	17.	
5	1.23	18.	
2	0.49	19.	
12	2.96	20.	
1	0.25	21.	
4	0.99	22.	
2	0.49	23.	
4	0.99	24.	
18	4.44	25.	
3	0.74	26.	
1	0.25	27.	
6	1.48	28.	
2	0.49	29.	
29	7.16	30.	

2	0.49	31.	
5	1.23	32.	
2	0.49	33.	
2	0.49	34.	
16	3.95	35.	
3	0.74	36.	
3	0.74	38.	
1	0.25	39.	
20	4.94	40.	
2	0.49	41.	
5	1.23	42.	
1	0.25	44.	
18	4.44	45.	
1	0.25	46.	
1	0.25	47.	
2	0.49	48.	
27	6.67	50.	
1	0.25	54.	
6	1.48	55.	
2	0.49	56.	
20	4.94	60.	
1	0.25	61.	
2	0.49	62.	
1	0.25	64.	
13	3.21	65.	
8	1.98	70.	
5	1.23	75.	
6	1.48	80.	
2	0.49	85.	
2	0.49	90.	
5	1.23	100.	
2	0.49	110.	
2	0.49	120.	
1	0.25	130.	
1	0.25	138.	
1	0.25	150.	
1	0.25	195.	
2	0.49	200.	
1	0.25	250.	
1	0.25	300.	
1	0.25	465.	
1	0.25	500.	
0	0.00	650.	$650,000 (skip to q 111)
45	11.11	998.	DON'T KNOW/NOT SURE
29	7.16	999.	REFUSED

****

question 110 column(s) 54-55

Then {would/could} you tell me in which of the following GROUPS your total household income falls, from all sources, last year, BEFORE TAXES ? Please stop me when I reach your household income ... was it under $10,000, $10,000 to less than $20,000, $20,000 to less than $30,000, $30,000 to less than $40,000, $40,000 to less than $50,000, $50,000 to less than $60,000, $60,000 to less than $70,000, $70,000 to less than $80,000, or $80,000 or more ?

n	%		
4	0.99	01.	UNDER $10,000
8	1.98	02.	$10 TO LESS THAN $20,000
11	2.72	03.	$20 TO LESS THAN $30,000
9	2.22	04.	$30 TO LESS THAN $40,000
5	1.23	05.	$40 TO LESS THAN $50,000
2	0.49	06.	$50 TO LESS THAN $60,000
1	0.25	07.	$60 TO LESS THAN $70,000
0	0.00	08.	$70 TO LESS THAN $80,000
1	0.25	09.	$80,000 OR MORE
9	2.22	98.	DON'T KNOW/NOT SURE
24	5.93	99.	REFUSED
331	81.73	^.	INAP

****

question 111 column(s) 56

Do you have more than one telephone number in your household ?

DIFFERENTIATE BETWEEN TELEPHONE NUMBERS AND TELEPHONE SETS IF NECESSARY.

n	%		
53	13.09	1.	YES
352	86.91	2.	NO (skip to q 112a)
0	0.00	8.	DON'T KNOW/NOT SURE (skip to q 112a)
0	0.00	9.	REFUSED (skip to q 112a)

```
**********************************************************************
question 112           column(s) 57-57

How many residential telephone numbers do you have, not counting
cellular numbers ?

  n      %
-----  ------
   15    3.70           1.  1 NUMBER
   35    8.64           2.  2 NUMBERS
    1    0.25           3.  3 NUMBERS
    1    0.25           4.  4 NUMBERS
    1    0.25           5.  5 NUMBERS
    0    0.00           6.  6 NUMBERS
    0    0.00           7.  7 NUMBERS
    0    0.00           8.  DON'T KNOW/NOT SURE
    0    0.00           9.  REFUSED
  352   86.91           ^.  INAP


************************************

project 3175    n of cases  405.0

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deck03

**********************************************************************
question 112a          column(s) 6

It is very important that we get accurate information for this
study. Sometimes, we call people back if any information is
unclear. Would it be O.K. to call back if we have any questions ?
  n      %
-----  ------
  395   97.53           1.  YES
   10    2.47           2.  NO
    0    0.00           8.  DON'T KNOW/NOT SURE
    0    0.00           9.  REFUSED

**********************************************************************
question 998b          column(s) 7

SEX OF RESPONDENT:

  n      %
-----  ------
  229   56.54           1.  MALE
  176   43.46           2.  FEMALE
```

```
**********************************************************************
question 998e          column(s) 8-8

INTERVIEWER:  IN WHAT LANGUAGE WAS THIS INTERVIEW DONE ?

  n      %
-----  ------
  405   100.00          1.  ENGLISH
    0     0.00          2.  SPANISH
    0     0.00          3.  MIXED ENGLISH/SPANISH
    0     0.00          4.  R IS TTY USER/USED WI RELAY OPERATOR
    0     0.00          0.  OTHER (SPECIFY: _____________)

**********************************************************************
question 998m          column(s) 9

INTERVIEWER: PLEASE ENTER YOUR SEX

  n      %
-----  ------
  219   54.07           1.  MALE
  186   45.93           2.  FEMALE

**********************************************************************
question DOC          column(s) 10-17

Date of Interview Completion

**********************************************************************

question WGT          column(s) 18

Weight Variables

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